QUICK-BUILD MINI MUSTANG page 98

SCALE SHOWSTOPPERS! page 38

MODEL Airplane NEWS

EDITORS' PICKS

AEROBATIC ALL-STARS

10 BEST ARFS

WE SHOW YOU HOW!

Bulletproof hinges

Fast foam-wing fixes

World-Class Performance

Great Planes' Extra 300

IN THE AIR

> Eindecker—*elegant WW I fighter*

> Stingray Splash—*pattern/floatplane*

> Mini Phoenix—*backyard sailplane*

> Caliber—*.30-size sport heli*

modelairplanenews.com

AirAGE MEDIA
JUNE 2003

$4.99US $7.99CAN

06

0 71896 48120

MODEL Airplane NEWS

JUNE 2003 VOLUME 131, NUMBER 6

ON THE COVER: *looking every bit as exciting as the full-size Extra 300 flown by Patty Wagstaff, the Great Planes ¼-scale ARF comes in low for the camera!*

FEATURES

30 Aerobatic ARFs Editors' top 10 picks
Pump up the adrenaline!
by the Model Airplane News crew

38 Scale Masters Championship
Duel in the desert
by Jerry Nelson

80 How to Easy CA Hinges
Control-surface installation in eight simple steps
by Erick Royer

92 How to Repair Foam-core Wings
A quick and easy fix
by John Reid

CONSTRUCTION

84 Electric Curtiss P-40
An inexpensive, easy-to-build Warhawk!
by Mark Rittinger

FLIGHT TESTS

44 GREAT PLANES Extra 300S ARF
State-of-the-art, high-performance aerobatic ARF
by Rick Bell

54 MRC/ALTECH Stingray Splash
An aerobatic ace with floats!
by Jim Onorato

60 CERMARK Mini Phoenix
Fly-anywhere sailplane
by Bob Van Tassel

66 SUPER FLYING MODELS Eindecker
Classic, almost-ready-to-fly fighter
by Peter Abbe

72 KYOSHO Caliber 30 ARF
A versatile and potent performer
by Rick Bell

COLUMNS

15 Air Scoop
by the Model Airplane News crew

98 Backyard Flyer
Megatech's P-51D Mustang—one potent pony!
by Martin Robinson

108 Thinking Big
Ultimate champ
by Gerry Yarrish

120 RPM Real Performance Measurement
2-needle, 2-speed engines and more
by Dave Gierke

162 Final Approach
Radio-control flight—from hobby to career
by John Reid

DEPARTMENTS

8 Editorial
10 Airwaves
20 Tips & Tricks
24 Pilot Projects
132 Grassroots
138 Classifieds
146 Name that Plane
156 RCStore.com
161 Customer Service Information
161 Index of Advertisers

Hottest trend in RC

High-energy extreme sports are everywhere you turn these days—including RC flying fields! No doubt about it: aerobatics—and aerobatic model planes—are hot, and more new aerobats hit hobby-store shelves every day. Even better, the industry trend toward top-quality, complete, almost-ready-to-fly (ARF) models has recently begun to include the world of aerobats, so those high-performance, high-flying machines are available to everyone—not just those with the time (and skills) to build them at home. Is an aerobatic model plane in your future? Whether you're looking for your first sport aerobat or you're ready for high-flying, 3D, Tournament of Champions-style maneuvers, you'll be able to find dozens of models that meet your needs—in electric, glow and gas sizes and configurations. We recently put quite a few of these awesome aerobats through their paces, and in this issue, we highlight our favorites based on performance, price, looks and ease of assembly. Check out our **"Aerobatic ARFs—Editors' Top 10 Picks"** article on page 30 to see which ARF aerobats came out on top; then get ready to put on a show!

Today's ARF aerobats, such as this Laser 2000 from Super Kraft, feature high-quality construction and excellent flight characteristics. Check out our favorites on page 30.

WE SHOW YOU HOW!

This month, we have two how-to articles that will surely help simplify your workshop time. Anyone who has a broken foam wing sitting on his work table will appreciate West Coast associate editor John Reid's simple repair tricks. Don't toss out that damaged foam wing; with just a little time and effort, it can look like new.

There are dozens of ways to hinge control surfaces, but cyanoacrylate (CA) hinges are a popular choice for many kit and ARF models. Installing CA hinges for proper deflection and durability is easy with the right tools and techniques, and in his **"Easy CA Hinges"** article, Erick Royer explains the procedure step by step.

Builders who want a more involved project will appreciate this month's featured construction article: a Speed-400-powered Curtiss P-40. Designed by Mark Rittinger to be easy and inexpensive to build, this little warbird also offers great performance.

SCALE SHOWSTOPPERS

With its very competitive selection process, the annual U.S. Scale Masters Championship is one of the premier scale events in North America. At the 23rd edition, more than 50 master craftsmen and pilots showed off their museum-quality planes. Don't miss **Jerry Nelson's coverage** of these scale showstoppers; it begins on page 38.

MODEL Airplane NEWS
FOUNDED 1929

EDITORIAL
Executive Editor DEBRA CLEGHORN
Senior Technical Editor GERRY YARRISH
Associate Editor RICK BELL
West Coast Associate Editor JOHN REID
Associate Managing Editor JAIME LAGOR
Assistant Editor MATT BOYD
Editorial Assistant MELISSA JONES

PUBLISHING
Group Publishers LOUIS V. DeFRANCESCO JR., YVONNE M. DeFRANCESCO
Associate Publisher RICK VANDERVOORN

COPY
Copy Director LYNNE SEWELL
Senior Copyeditor MOLLY Z. O'BYRNE
Copyeditors COREY WEBER, PAIGE L. HAMILTON

ART / DESIGN
Corporate Art Director BETTY K. NERO
Senior Art Director LESLIE COSTA
Promo Designer CHRISTOPHER CHU
Associate Art Director VICTORIA HOWELL
Staff Photographer PETE HALL

ADVERTISING
Director of Sales RICK VANDERVOORN
Senior Account Executives MONA TASSONE, KATHRYN GEARHART
Account Executives JOHN ELLERTSON, CRAIG BIANCO, ALEX CHU, CHRISTINE DILAURO
Advertising Coordinator ANN T. WIEBER
Sales Administrator YVONNE GAGNIER-RODNEY

BUSINESS DEVELOPMENT
Director of New Business Development LINDA D. TELESCO

CIRCULATION
Circulation Director KATHY RHODES
Circulation Manager STACEY NELSON
Product Marketing Manager JASON BONGO

MARKETING
Media Marketing Manager VANESSA LaFERRIERE
Marketing Assistant MARIE TERIO

PRODUCTION
Director of Production and Manufacturing STEPHEN R. BEST
Senior Digital Production Coordinator CHRISTINE BACHMANN
Digital Production Coordinator CHRISTINA MASCHKE-MILEO
Production Associate TOMLINSON S. WHEELER
Production Assistant BOBBI-JO BALDWICK

INTERNET
Web Developers LEO FICKS, HOLLY HANSEN
Web Programmer JAIME TORRES

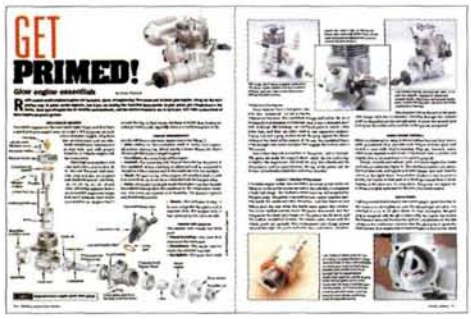
CORPORATE
Chairman of the Board ALDO DeFRANCESCO
President and CEO LOUIS V. DeFRANCESCO JR.
Executive Vice President YVONNE M. DeFRANCESCO
Chief Financial Officer CAROL SHEPHERD

CONTRIBUTORS
Bob Aberle, Bernard Cawley, Roy L. Clough Jr., Roy Day, Don Edberg, Dave Garwood, Dave Gierke, Henry Haffke, Tom Hunt, Michael Lachowski, Andy Lennon, George Lee, Jim Newman, Vic Olivett, Jim Onorato, Dave Patrick, Randy Randolph, Jef Raskin, Faye Stilley, John Tanzer, Craig Trachten, Rich Uravitch, Bob Van Tassel, Dan Wolanski, Nick Ziroli.

Member Audit Bureau of Circulations
AirAGE MEDIA
MPA Magazine Publishers of America

100 East Ridge, Ridgefield, CT 06877-4606 USA
www.modelairplanenews.com
PRINTED IN THE USA

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA; email man@airage.com. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.



GETTING PRIMED

I am a new modeler, and I found your "Get Primed! Glow engine essentials" article in the April 2003 issue most helpful! I started a couple of years ago with small electric backyard models and moved up to glow-powered ones last summer. I have struggled to really understand how model airplane engines work and how to properly adjust the needle valve. Many of my flights have ended on deadstick landings because the engine quit running after a very short time. I now know that I was running my engine too lean. I also switched to a fuel with more oil content. I had previously used fuel that I got from a buddy who runs RC cars; I am not sure what its oil content was, but the newer model airplane fuel I have has 18-percent oil, and my engine runs much cooler and more reliably. For my next model, I would like to try a 4-stroke engine, so if you don't have anything better to do, I wish you would publish a similar article for the 4-strokers!

RANDY WATKINSON
Wichita, KS

Randy, I'm pleased that you found the article helpful. The best thing you can do for your model airplane engine is to run it on the rich side! As you have found out, oil content is also a very important thing for model airplane fuel. Always buy fuel brands that state the oil content right on the label. As with any modeling purchase, your engine is an investment in your hobby, and it's very important to protect that investment with proper operation and care.

That's a pretty good idea about our covering 4-stroke-engine operation; we'll see what we can come up with. Until then, have fun with your glow-powered airplane! GY

PITTS SPECIAL AILERON MODS

I am very interested in building a Great Planes 1/3-scale Pitts Special ARF. I read the review in your February 2003 issue, and I have a question. You described how you switched from the stock 4-aileron servo setup (one for each control surface) to a 2-aileron servo setup. How exactly did you do this, and what hardware did you use? Is there anything else I should know before I do the same thing to my Pitts? [email]

ELMER

Elmer, thanks for reading Model Airplane News. *I had a great time reviewing and, of*

course, flying Great Plane's new, 1/3-scale Pitts ARF. In the bottom wing, I used two servos with 75 oz.-in. of torque to control the ailerons. I then used slave rods to connect the lower control surfaces to the upper ones. I made them with metal 4-40 clevises, threaded rods and K&S teardrop-shape brass tubes. I threaded the rod into one clevis, then slipped it into the brass tube and threaded the second clevis onto the other end. I adjusted the length of the rod and then soldered the clevises to the inside of the brass tube.

I attached the slave rods to the midpoint of the ailerons in an unusual way; I bought a couple of Du-Bro 1/4-scale turnbuckles (these are basically long screws with flattened tabs and holes in the ends) and removed the threaded portions. I drilled holes in the ailerons and screwed these attachment points into place. When I had properly adjusted everything, I used thin CA glue to secure them. I did not install any type of hard points or attachment plates; I simply drilled the holes, screwed in the attachment fittings and then used CA to lock them into place. I have made almost 40 flights with the model now and have not had any trouble with the setup. The scale speeds at which I fly the model have presented no problems with flutter.

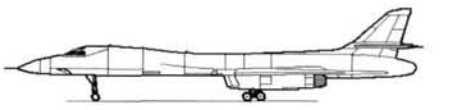
Again, thanks for reading, and I hope you enjoy your Pitts Special. Remember, don't slow it down too much on landing. GY

DAWN PATROL EVENT

I remember reading an article about a Connecticut club that holds a WW I fun-fly similar to the big jamboree held annually at the Old Rhinebeck Aerodrome in New York. Do you have any information about this event? I love watching those older models patrolling the skies over the trenches! [email]

THOMAS D'ANGELO

Thomas, you must mean the giant-scale WW I Dawn Patrol fly-in held each year in Ellington, CT, and hosted by the Northern Connecticut Radio Control Club (NCRCC). It's open to all IMAA-legal models from WW I vintage up to the Golden Age of aviation. The only rule is "No Cubs allowed." This year's Dawn Patrol will be held July 6, 2003. For more information, contact Paul Savastano at (860) 872-6303, or send email to dawnpatrol536@juno.com. You can also check out the NCRCC's website at www.ncrcc.org. GY



NEW PRODUCTS OR PEOPLE hit the model airplane market all the time, so here's the inside source for what's hot and where you can get it. Every issue, we sift through product announcements, show reports, rumors and prototypes to let you in on the best and the latest. Remember, you saw it here first!

AIR SCOOP

by the Model Airplane News *crew*

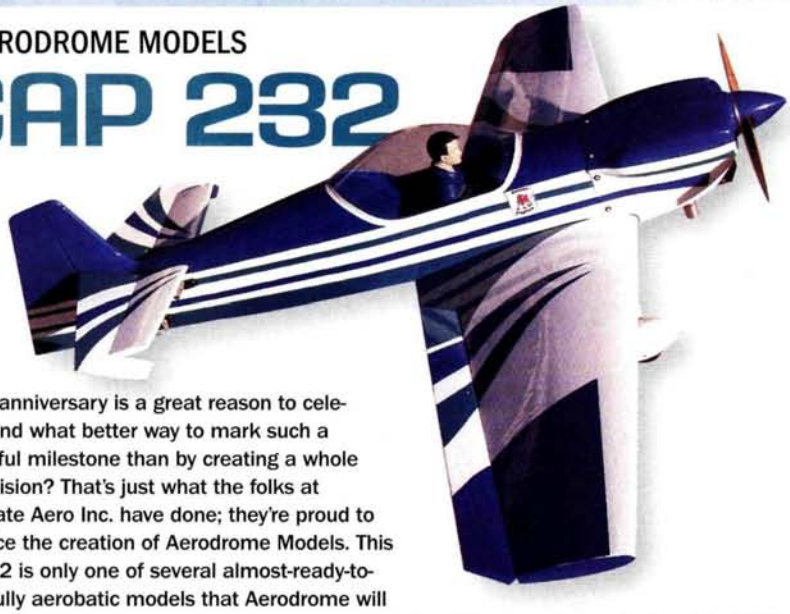
HANGAR 9 Texan & ultimate Bipe

If you want a plane that will deliver Tournament of Champions-level performance, who better to design it than eight-time TOC competitor Mike McConville? The new, 46-percent Ultimate bipe ARF from Hangar 9 is both IMAC- and TOC-legal, and it features strong balsa and ply construction with Ultracote covering and high-quality carbon-fiber and fiberglass parts, including carbon-fiber landing gear. This 100-inch-wingspan aerobat is perfect for both precision aerobatics and extreme freestyle maneuvers. It requires a 150cc to 200cc gas engine and sells for $1,699.99.

Of course, the folks at Hangar 9 have something new for you scale enthusiasts, too. The new .60-size AT-6 Texan ARF is a skillfully crafted scale rendition of one of WW II's most famous trainers. In addition to its incredible scale appearance, the Hangar 9 Texan features factory-installed retracts and comes with gear doors and a mock radial engine. It requires a 5-channel radio and a .60 to .78 2-stroke or .65 to .2.00 4-stroke engine and will sell for $254.99.

Hangar 9; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.

AERODROME MODELS CAP 232



A 10th anniversary is a great reason to celebrate, and what better way to mark such a wonderful milestone than by creating a whole new division? That's just what the folks at Southgate Aero Inc. have done; they're proud to introduce the creation of Aerodrome Models. This CAP 232 is only one of several almost-ready-to-cover, fully aerobatic models that Aerodrome will offer. That's right—fully aerobatic. Aerodrome Models will feature planes designed *by* IMAC pilots *for* IMAC pilots. Constructed of premium-grade balsa and ply with a fully sheeted wing and tail feathers, all Aerodrome models will feature laminated ply and carbon-fiber firewalls, removable wings and horizontal stabs with servo cutouts, lightweight fiberglass cowls, wheel fairings, aluminum landing gear, clear canopies and illustrated instruction manuals. The kits will also be available in a combination package with a Taurus engine. The 31-percent CAP 232 (shown here) sells for $526.

Aerodrome Models; a division of Southgate Aero Inc. (734) 283-4813; aerodromemodels.com.

Transmitter tray

Do your arms ever get tired from trying to hold your transmitter up during marathon flying sessions? Boy, do we have a tool for you! This new transmitter tray, constructed of red-anodized aluminum, features hand rests, self-adhesive hook-and-loop fastener to secure your transmitter, self-adhesive rubber padding for added hand and shoulder comfort and a protective rubber pad. The tray comes almost completely assembled (just attach the shoulder straps) and sells for $110.

A+Z Custom LLC; distributed by RC Trayman USA (818) 982-5518; rctraymanusa.com.

O.K. MODELS *Cinnamon*

Looking for an easy entry into the world of gliders? Check out the new Cinnamon from O.K. Models. The newest addition to its "V-Pro" line of high-quality models, the almost-ready-to-fly Cinnamon is constructed mainly of plastic with a film-covered balsa wing. A Speed 380 motor comes installed, and a 6x4 folding prop is included. Simply add a 3-channel radio and two servos, and you can be in the air in no time at all. The Cinnamon has a 58-inch wingspan and sells for $175.

O.K. Models; distributed by MRC/Altech (732) 225-2100; modelrectifier.com.

GLOBAL HOBBY Kwik Fly II

Attention, fans of the Global Kwik Fly ARF: we have news that's sure to heat up your summer. Introducing the new and improved Kwik Fly II ARF, which the folks at Global have clearly worked long and hard on; just check out this list of improvements. They removed the dihedral, added a center flap, constructed the plane entirely of wood and foam with a high-quality iron-on covering, added a factory-painted fiberglass cowl, turned the engine on its side, gave the stabilizer an airfoil shape and improved the control system. Whew! The 66½-inch-wingspan Kwik Fly II requires a 5-channel radio and a .61 to .91 2-stroke or .80 to .91 4-stroke engine. It sells for $159.99.

Global Hobby Distributors (714) 963-0329; globalhobby.com.

CARL GOLDBERG PRODUCTS Lightnin' Bug

The new Lightnin' Bug from Carl Goldberg Products is a great fly-anywhere, fly-anytime model. Constructed entirely of jig-built wood and covered in high-quality, iron-on covering, the Lightnin' Bug comes almost completely assembled and includes a Speed 400 motor with gear reduction and a prop. Its simple assembly and relaxing flight characteristics are sure to entice beginner and seasoned pilots alike. Pick one up, and throw it in the back seat of your car; it's the perfect plane to have on hand for those impromptu flying sessions. It sells for $129.99.

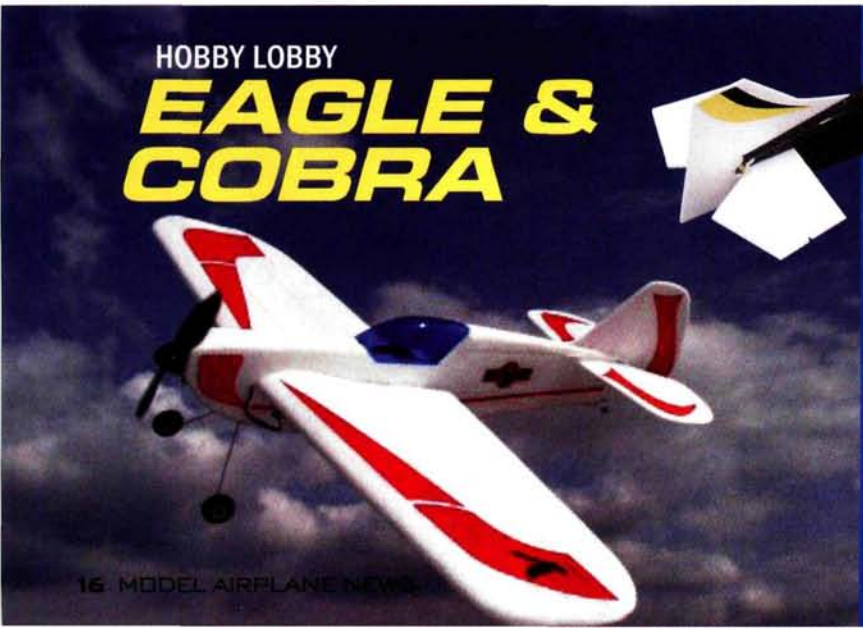
Carl Goldberg Products; distributed by Lanier RC (770) 532-6401; lanierrc.com.

RETRO GIFTS INC. Collectible Clocks

Here's one for the mantle—or just above it, anyway. In celebration of 100 years of flight, Retro Gifts has teamed with the folks at Boeing, McDonnell Douglas and Northrop Grumman to produce a new line of decorative aluminum clocks. A perfect blend of nostalgic 1940's style with the high-quality graphic standards of today, the more than 50 colorful images span the history of flight. These 14-inch-diameter clocks sell for just $39.95 each.

Retro Gifts Inc. (800) 446-3714; eparadon.com.

HOBBY LOBBY EAGLE & COBRA



Check out these two new backyard beauties from Hobby Lobby. The 35½-inch-wingspan Eagle is a fun flyer that can be flown both indoors and out. If you're looking for something with a little more action, then it's the 30¾-inch-wingspan Cobra you'll want to check out. Either way, here's what you'll get: an almost-ready-to-fly model constructed of EPP foam, an installed Speed 300 motor geared 5:1 with a 9.5x4.7 folding prop and a Potensky Turbo 8A speed control already wired in. Both models are priced at just $129, so you really can't go wrong.

Hobby Lobby Intl. (615) 373-1444; hobby-lobby.com.

FALCON AIR RC
MDM-1 FOX

Falcon Air RC is among the newest names on the RC scene, and first out of its hangar is this MDM-1 Fox aerobatic glider—a semi-scale, 2M slope plane. The kit features EPP foam and balsa for the tailpieces. When assembled, the MDM-1 Fox has a 31-inch wingspan and weighs between 20 and 26 ounces. The kit sells for $79.95.

Falcon Air RC (970) 726-7126; falconairrc.com.

FUJI
BT-50SB

A big part of the allure of gas engines is their ease of operation; they're smooth, reliable and don't require a lot of adjusting. Now, thanks to Fuji, they're amazingly easy to start, too! The BT-50SB is Fuji's new 3ci engine that has a usable rev range of 1,200 to 10,000rpm and peaks out at 5.2hp. The key feature, though, is the pairing of a Walbro pumper carb and Fuji's automatic timing module (ATM), which retards the spark timing during startup to eliminate kickbacks and help the engine fire more easily. The ATM reads the increase in rpm from magnets on the flywheel and automatically advances the timing as the revs increase, boosting high-rpm power. Like all Fujis, it has been specifically designed for model applications. Fuji claims that the BT-50SB will turn a 20x10 wood prop at 7,000rpm—not bad for the expected street price of $429.

Fuji; distributed by Great Planes Model Distributors (800) 637-7660; fujiengines.com.

JET & SPEED MODELS
KASUMI 21

The aircraft produced by Jet & Speed Models have been tearing up the skies over the Netherlands for several years, and thanks to recent developments in the distribution department, it's at last easier for folks on this side of the pond to get in on the action. First up is this 40-inch-wingspan Kasumi 21; it features a brightly colored, carbon-reinforced epoxy fuselage, an obechi-sheeted foam wing and a plan. The Kasumi 21 is also available with a wing specially designed for Club 20 pylon racing. It should be powered by a .20 to .30 engine, and it sells for $85.

Jet & Speed Models; distributed by Hobby Barn (800) 324-4910 (orders only); (520) 747-3792; hobbybarn.com.

BRUCE THARPE ENGINEERING
SUPER FLYIN' KING

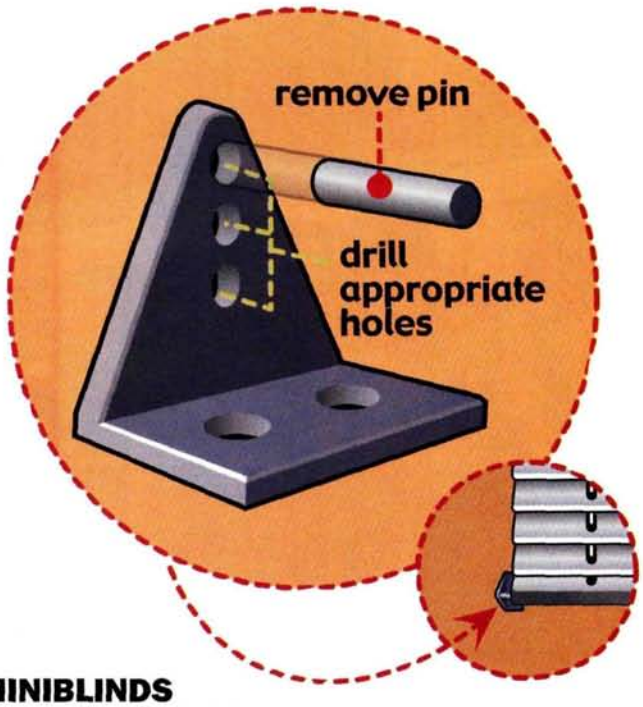
What could be better than Bruce Tharpe Engineering's Flyin' King? Why, the Super Flyin' King, of course—especially if you're a giant-scale enthusiast. The 132-inch-wingspan Super Flyin' King is 60 percent larger than its little brother. If you've been looking for a model that's capable of towing giant sailplanes or hauling huge payloads, or even if you just need a test bed for that big new gas engine, your search is over. The Super Flyin' King features a three-piece wing with Sig aluminum wing joiners, aluminum landing gear, full-size plans, a photo-illustrated (in color) instruction manual and, of course, accurately machine-cut wood parts, including all the necessary balsa sheets and sticks. The Super Flyin' King sells for $499.95.

Bruce Tharpe Engineering (800) 557-4470; btemodels.com.

TIPS & TRICKS

Illustrations by David Baker

SEND IN YOUR IDEAS. *Model Airplane News* will give a free, one-year subscription (or a one-year renewal, if you already subscribe) for each idea used in "Tips & Tricks." Send a rough sketch to *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can neither acknowledge each one nor return unused material.



MINIBLINDS CONTROL HORN

The next time you pull down the miniblinds on a door or window, take note of the little plastic retaining bracket that prevents the bottom of the blinds from swinging around. Just cut off the molded pin and drill the appropriate holes, and you'll have a great control horn for a small, low-powered model. The strong bracket material is ideally suited for the task.

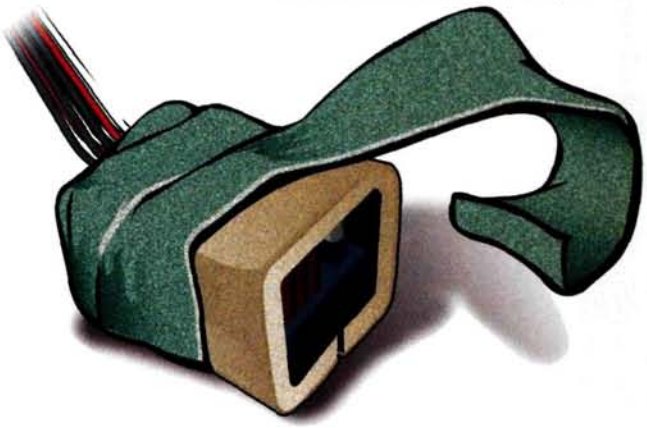
Don Baker, Aiken, SC

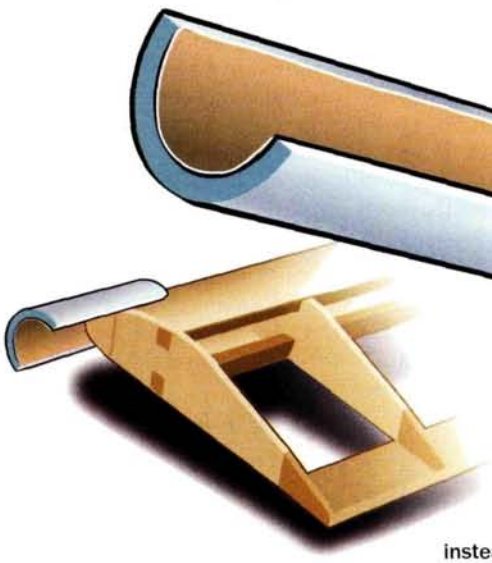
WRAPAROUND PROTECTION

Masking tape and rubber bands are the items most used to hold foam padding around receivers, but they certainly don't add much in the looks department. For a greatly improved look, try a product called PetFlex. This cohesive, latex wrap is used as a temporary protective bandage for animal injuries, and it's also almost identical to the temporary bandages used on human patients. It is available at the larger pet-supply stores and comes in many bright colors including lime green, fluorescent pink, dark and light blue, purple and red.

You can easily wrap this flexible material around your foam-padded receiver; it adheres to itself, thereby eliminating the need for tapes or rubber bands. Use it to wrap foam around fuel tanks and to bundle long servo leads. It has many uses; just use your imagination.

Richard Breckwoldt, Marietta, GA





PERFECT LEADING EDGES

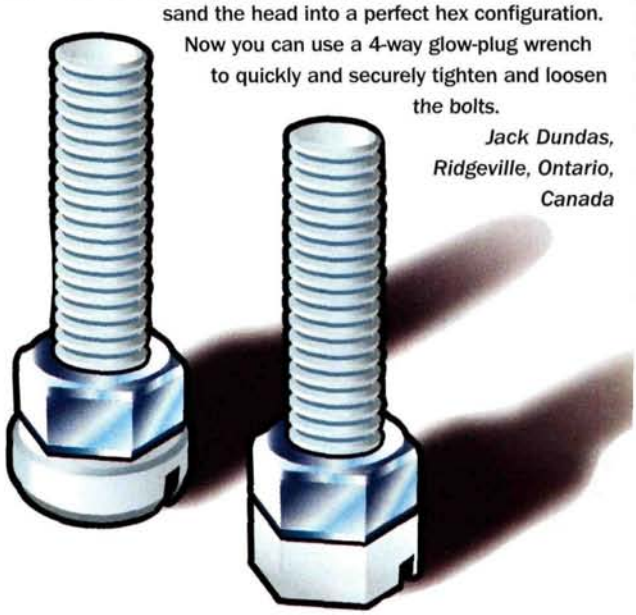
Producing a perfectly shaped leading edge on a rudder or stabilizer can be challenging if you use a flat sanding block; it is easy to sand a flat spot into the wood, thereby altering the radius. Avoid this and instead use a piece of ½-inch PVC pipe with stick-on 80-grit sandpaper bonded to its inside surface. Cut the pipe to a comfortable length (4 to 8 inches), and smooth the edges a bit with a file. Your new self-centering-radius sanding tool will make rounding the control-surface edges faster and easier. Larger radius sanders can be used for shaping wing leading edges.

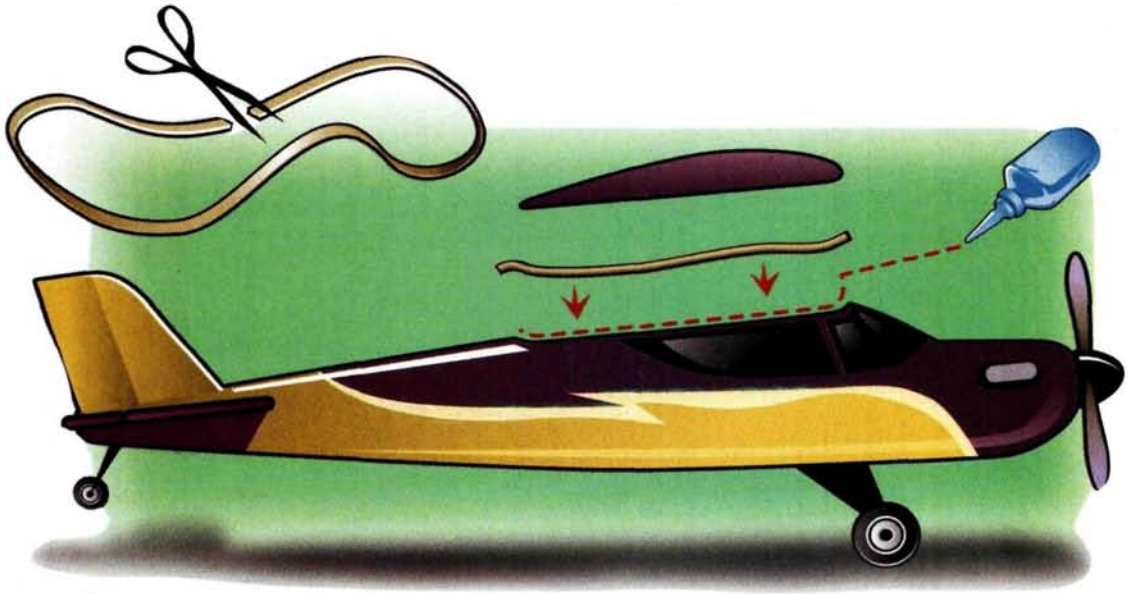
Jeff Owsley, Kansas City, MO

HEXING YOUR SCREW

Nylon wing-hold-down bolts usually come with round, slotted heads intended for use with a large common screwdriver. They work, but chances are that the screwdriver may slip while you tighten the bolt. Take a 7/16-inch hex nut and run it all the way under the round bolt head, and use the nut as a template to sand the head into a perfect hex configuration. Now you can use a 4-way glow-plug wrench to quickly and securely tighten and loosen the bolts.

Jack Dundas, Ridgeville, Ontario, Canada





SOFT SADDLES

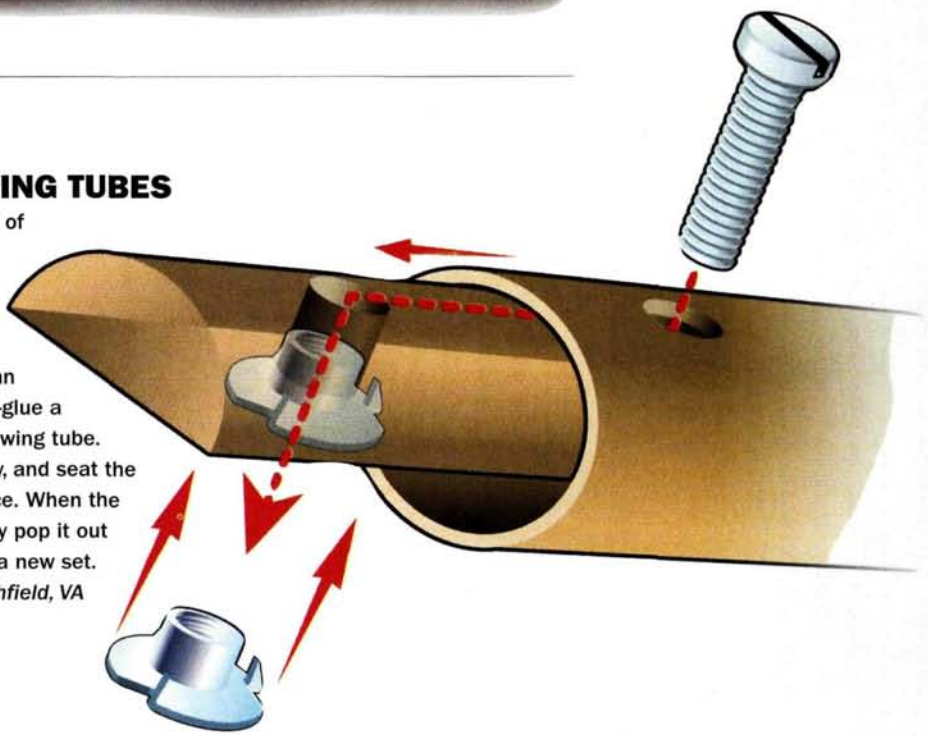
A simple and cheap way to seal wing saddles is to use a large rubber band—the kind used to bundle a load of mail. Simply cut the rubber band so it becomes a single flat strip, and with CA, glue it into place over the saddle edges on the fuselage. The natural rubber absorbs vibration, cushions the wing and costs nothing!

Walt Calkins, Kansas City, MO

WONDERFUL WING TUBES

Have attachment screws ever stripped out of your plug-in wing panel? Many designs use vertical screws or bolts that thread through the top of the wing and into the ends of the one-piece joiner tube. After time, the threads in the aluminum tube can wear out. A good alternative is to tack-glue a dowel and a blind nut in each end of the wing tube. Split the dowel in half the long way, and seat the blind nut in the dowel's flat surface. When the bolt or blind nut strips out, simply pop it out of the tube and install a new set.

Aaron Hayes, Smithfield, VA



A THIMBLEFUL OF HELP

Here's an easier way to install metal hardware in hard-to-reach areas inside your model. Drill a hole in a sewing thimble, and epoxy a miniature magnet into it. Place the thimble on your fingertip and the metal hardware item on the magnet. Now guide the item to that hard-to-reach spot and install it. Thimbles come in several sizes, and the new mini magnets are very strong and will hold nuts, screws and other metals securely. This is also ideal for retrieving small screws and nuts that fall deep into the model.

Glenn Elliott, Houston, TX +

www.zenoah.com

ZENOAH®


GT80


G62


G45


G38


G26

The gold standard
in gas engines

LEGENDARY QUALITY

You know that Zenoah® is the benchmark for reliability and power in two stroke gas engines. But do you know why? *Quality control.*

Not the buzzwords, but actual procedures are put in place at Zenoah's factory by which Zenoah engineers monitor and evaluate every step of the manufacturing process. You see, except for the carburetors and spark plugs, Zenoah produces every engine component entirely on site to the strictest tolerances. The result is a 2-stroke gasoline engine that offers exceptional power with flawless operation.

Everyone talks about quality, power and reliability. Zenoah delivers—from foundry to final assembly.

PILOT PROJECTS

SEND IN YOUR SNAPSHOTS. *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable but please do not send digital printouts. We receive so many photographs that we are unable to return them. All photos used in this section will be eligible for a grand prize of $500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in! Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

George Jarvis
Manuels, Newfoundland, Canada
LAZY ACE

This 76-inch-wingspan Lazy Ace represents George's first attempt at building from plans. Maybe you really don't need all that much practice to make it perfect, eh George? Built from a set of Chuck Cunningham plans, this Lazy Ace features a Zenoah G23 for power and a Futaba 8U radio for control. George decided to give the model a little WW I flair by adding decals and a fiberglass cowl that was originally designed for the Dynaflite Chipmunk. He says his favorite thing about the Lazy Ace is its slow, scale-like flight. Thanks for the pic, George!

Col. Bob Shanks, Tucson, AZ
ELDER BIPLANE

Originally built by Col. Burt Phythyon of the U.S. Air Force, this Elder Biplane, built from a Top Flite kit, has spent a fair share of its years in the hangar. When he recently retrieved it from storage, Col. Shanks quickly realized that the years of neglect had taken their toll, so he got to work. After carefully sanding away four layers of multicolored covering, he used LustreKote paint to create that striking camouflage scheme and sealed it with LustreKote Flat. Col. Shanks then topped it off with German WW II markings. Powered by a Thunder Tiger .91 4-stroke engine and controlled by a JR radio, the ol' Elder is now as good as new. Great work!

Chuck Barsony
Brantford, Ontario, Canada
EXTRA 300S

Chuck is no stranger to "Pilot's Projects." A photo of his Ultimate Bipe appeared in the November 2002 issue of *Model Airplane News*, and we just couldn't leave out this pic of his Extra 300S dressed in the same striking color scheme. Built from an Ohio R/C Models kit, Chuck's Extra is powered by a Moki 1.20 engine spinning a 16x8 APC prop. It's finished with an array of coverings, including Solartex with K&B epoxy, Ultracote and brushed aluminum on the landing gear. Although the Extra has yet to see any airtime, Chuck believes it promises to be a very spirited performer. His plans to add a Perry pump to help maintain engine speed during vertical maneuvers will definitely help.

Lonnie Brinson, Statesboro, GA
PETE 'N POKE

Although it isn't a truly scale model, the Great Planes Pete 'n Poke has always had a certain vintage appeal. And that's certainly true in the case of Lonnie's Pete 'n Poke Sport .40. According to Lonnie, it exhibits some very realistic flight characteristics. He powers the little high-wing wonder with a Magnum XL-61 RFS 4-stroke engine, and it's covered entirely with MonoKote. Nice job, Lonnie.

Pedro Apuy, San Jose, Costa Rica ▶
CAP 232

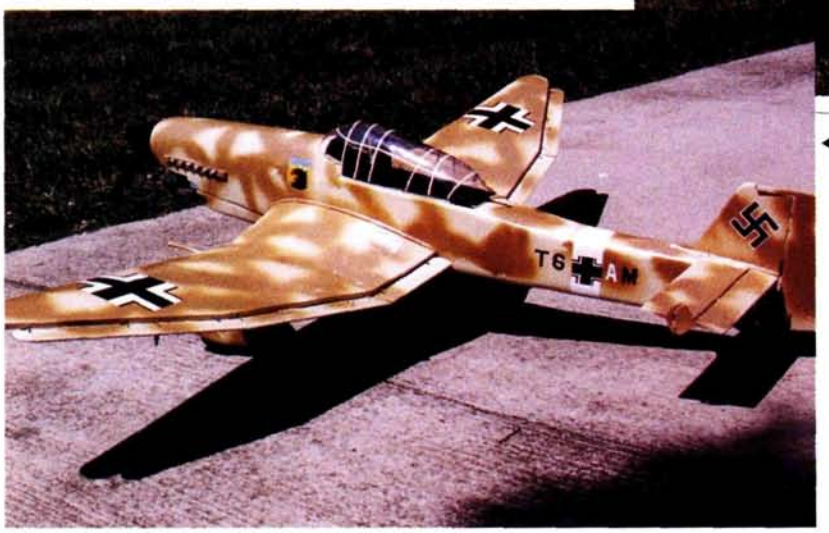
Believe it or not, this CAP 232 from Great Planes is Pedro's first kit-built model. What's even more amazing is that he built it in only 45 hours—not bad for a first-timer! He powers his 58-inch-wingpsan CAP with an O.S. .46 FX engine with a Pitts-style muffler and uses a Futaba Super 8 radio for control. It's covered with 3M vinyl. Great work, Pedro!

◀ **Carl Malta,** Jamestown, NY
SE5A

After wanting to build an SE5a for years, Carl decided it was time for action when he saw this 1/5-fun-scale kit from Dynaflite. Covered with Olive Drab on top and Beige on the bottom, Carl's SE5a has a 64-inch wingspan and weighs in at 11¼ pounds. It's powered by an O.S. FS .91S II 4-stroke engine and is controlled by a Hitec Eclipse 7 radio with four aileron servos, two elevator servos and one servo each for the rudder and throttle. As evidenced by the backdrop of snow, winter in the Northeast has delayed any flight tests, but if the model flies as good as it looks, we think it's safe to say that Carl has a winner on his hands!

Bob Schultheis, West Bend, WI ▶
CUNNINGHAM-HALL PT6

Now, here's a model you don't see every day. Built by Elton Rheaume of Wauwatosa, WI, this Cunningham-Hall PT6 is a 1/7-scale model of a full-scale plane that Bob saw at the Experimental Aircraft Association Show in Oshkosh several years ago. Powered by an O.S. 91 4-stroke engine, its 72-inch wingspan is covered entirely with silver Ultracote, and it features shock-absorbing landing gear. According to Bob, it's a very smooth flyer. We think it deserves an A+ for creativity, as well.

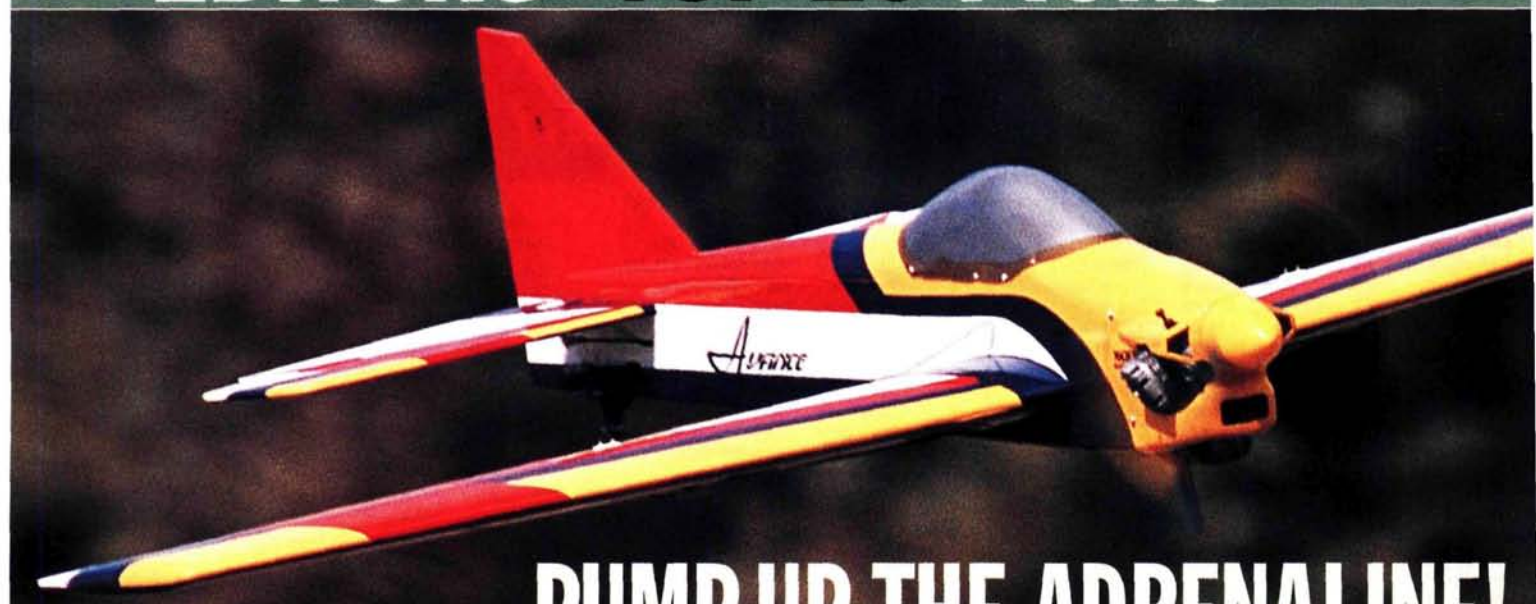


◀ **Chris Spees,** Simpsonville, SC
JU87-D STUKA

OK, we'll admit it; we're suckers for scale—but then again, who isn't? Well, this 1/9-scale dive-bomber is about as nice as they come. Chris scratch-built this 63-inch-wingspan JU87-D Stuka from a set of plans. It features hand-crafted fiberglass and epoxy wheel pants and a vacuum-formed clear canopy that Chris, of course, also made by hand. He powers his Stuka with a Thunder Tiger Pro .61 engine and uses a Futaba 8UAP radio to guide it through the air. It's finished with MonoKote and LustreKote. Although it's modeled after a dive-bomber, Chris reports that his Stuka flies like a low-wing trainer. Sounds as if you have the best of both worlds, Chris!

AEROBATIC ARFs—

EDITORS' TOP 10 PICKS



PUMP UP THE ADRENALINE!

by the Model Airplane News *crew*

The popularity of high-performance aerobatic airplanes is at an all-time high, and in today's market, there's a seemingly endless supply of almost-ready-to-fly (ARF) kits to choose from. Today, most ARFs have the highest levels of quality and durability, and their prices are hard to beat when you consider how much it would cost to scratch-build a comparable model on your own. And how much is your time worth? If, like most of us, you don't have a lot of building time, then ARF aerobats are a speedy way to get up into the aerobatic "box."

Over the past few years, we've reviewed quite a few aerobatic ARFs, and this article highlights some of the best we've flown! Whether you're looking for a smaller Sunday-afternoon Aresti weapon, an electric cloud dancer, or a bigger gasoline-powered IMAC performer, you're sure to find something to excite you here.

When we developed the idea of finding the best aerobatic ARF, we put our biases aside and compiled a list of contenders. We sat down and talked about several key issues, such as the model's overall appeal and attractiveness, and we considered more tangible qualities, such as design engineering and overall execution. From how well they were packed into their respective kit boxes to how easily the model went together, we sorted through a lot of little details. We also took into account how well the models flew; after all, isn't that what it's all about?

If you've been looking for a great new aerobatic ARF but haven't yet made your purchasing decision, check out these great aerobats to see how well they stack up!

LOBAL HOBBY AVANCE

BALANCING ACT

FOR A MODEL—especially an aerobatic one—to fly properly, its center of gravity (CG) must be in the correct location. A nose-heavy CG is great for a trainer because it increases its inherent stability and makes the model more forgiving. But in an aerobatic plane, a forward CG decreases its ability to maneuver quickly; it must fight the stability! Start with the CG in the center of the manufacturer's recommended range. Slowly move the CG forward or aft until you find the optimum balance between aerobatic agility and stability. Test-fly your model after each adjustment, and note the model's response to control inputs. You'll know the CG location is correct when the model can enter and exit maneuvers easily without needing many corrections.

LATERAL BALANCE

Before you test-fly your model, be sure to balance its wing from tip to tip. Small nails or screws inserted into the lighter wingtip are useful for making minor balance adjustments. To check the lateral balance, roll the model into straight and level inverted flight and then center the aileron stick. If either wingtip drops, add weight to the lighter tip.

You can also test the lateral balance by flying away from yourself (directly into the wind) and then pulling the model up into a tight loop. Make sure that you pull straight back on the elevator stick, and don't input any left or right aileron control. If the model exits the loop with one wing lower than the other, the balance is off. Add weight to the lighter wingtip, and test it again.

Use these fine-tuning tips to help "dial in" the flight characteristics to match your flying skills. Get comfortable with your model's response, and remember to make all balance changes very small.

GREAT PLANES ⅓-SCALE PITTS SPECIAL

LANIER RC CAP 232

NORTHEAST SAILPLANE PRODUCTS ACCORD II

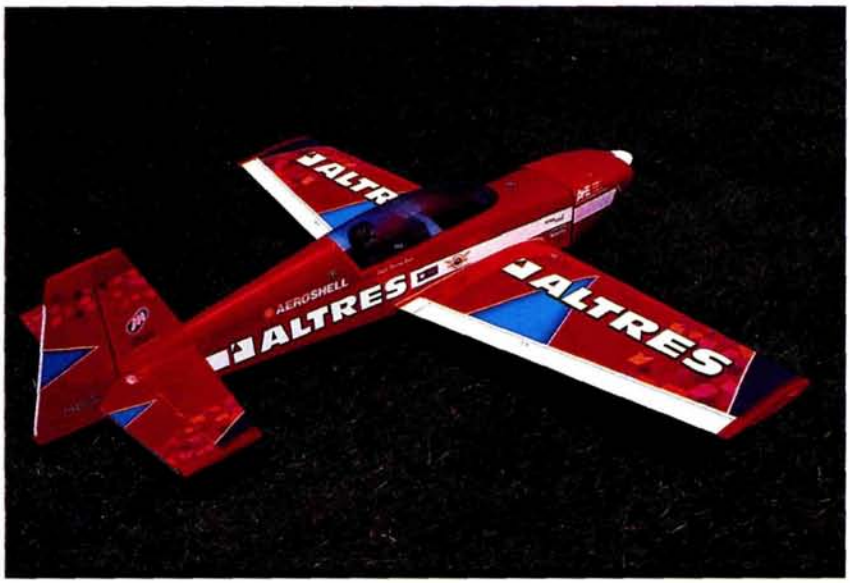
GAR 9 SUKHOI SU-31 ARF

MRC/ALTECH EZ EXTRA 330L

KYOSHO MAJESTIC 1400

TOP 10 PICKS

For modelers who want a jolt of excitement, flying aerobatic airplanes is just the thing to get the adrenaline flowing! Here are our 10 picks for the most aerobatic flying fun.



MRC/ALTECH

EZ EXTRA 330L

Wingspan: 50.4 in.
Engine req'd: .45 2-stroke or .70 4-stroke
Engine used: Enya .50CX
Price: $300
Why we like it: the EZ Extra 3330L gets high marks for its prefab finish and high-quality construction. The kit is very complete and easy to assemble. The three-layer laminated finish on the EZ Extra is fantastic! It contributes to the model's light wing loading and snappy performance.

Hits

- Good parts fit.
- Easy to assemble.
- Very complete kit.

Misses

- Carbon-fiber landing gear cracked on a rough landing.

MRC/Altech (732) 225-6144; modelrectifier.com.

HANGAR 9 SUKHOI

SU-31 ARF

Wingspan: 97 in.
Engine req'd: 60 to 80cc
Engine used: Zenoah GT-80 twin-cylinder gas engine
Price: $849.99
Why we like it: for sheer "presence" at the flying field, this one is in a class by itself! Designed by Mike McConville, the Hangar 9 Sukhoi SU-31 is a big, no-nonsense airplane that's intended for experienced modelers who want outstanding flying characteristics. It's a high-quality ARF that's built to withstand the rigors of aerobatic flying.

Hits

- Easy-to-follow instructions.
- Excellent flight performance.
- Beautifully covered.

Misses

- Hinge-gap sealing material not included.

Hangar 9; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.

YELLOW AIRCRAFT INTL.

CAP 232

Wingspan: 60 in.
Engine req'd: .60 to .80 2-stroke or .70 to .90 4-stroke
Engine used: Thunder Tiger F-9
Price: $286
Why we like it: one of the best flying .60-size aerobats, the Yellow Aircraft CAP 232 has superior quality throughout and includes a complete hardware package. The covering is expertly applied, and the model is a lot of fun to build and fly.

Hits

- Strong construction.
- Excellent scale appearance.
- Great flyer.

Misses

- Forward servo rail makes fuel-tank installation difficult.

Yellow Aircraft Intl. (781) 674-9898; yellowaircraft.com.

SUPER KRAFT

LASER 2000

Wingspan: 87 in.
Engine req'd: 2.4 to 3.2ci gasoline engine
Engine used: Brison Aircraft 2.4
Price: $497.77
Why we like it: a new twist on a classic scale design, this is an all-balsa and lite-ply built-up model, and it comes nicely covered in three-color, iron-on film. It's a fine-looking model and has excellent jig-built construction. It's a wonderful flying machine.

Hits

- Complete hardware package.
- High-quality materials and workmanship.
- Excellent flight performance.

Misses

- None.

Super Kraft; distributed by Kangke Industrial USA Inc. (877) 203-2377; kangkeusa.com.

KYOSHO

MAJESTIC 1400

Wingspan: 53 in.
Engine req'd: .30 to .40 2-stroke, .48 to .53 4-stroke
Engine used: O.S. FS-52S
Price: $249.99
Why we like it: ideal for your first taste of "pattern" flying, this model comes 90 percent complete and is built using balsa and lite-ply. It goes together easily, is expertly covered and flies great.

Hits
- Easy to build.
- Nicely covered.
- Great flight performance.

Misses
- Wheels and wheel pants are too small for grass runways.

Kyosho; distributed by Great Planes Model Distributors Co. (800) 637-7660; kyosho.com.

SIG MFG.

SOMETHIN' EXTRA

Wingspan: 51.5 in.
Engine req'd: .40 to .46 2-stroke or .56 to .65 4-stroke
Engine used: Saito FA-56 Golden Knight 4-stroke
Price: $199.99
Why we like it: one of the best classic fun-fly sport models to come down the pike—and nicely built with balsa and lite-ply—the Sig Somethin' Extra comes covered with Oracover. It includes all the necessary hardware and plug-in wing panels.

Hits
- Looks great.
- Easy to assemble.
- Great flight performance.

Misses
- Hinge installation was incorrect.

Sig Mfg. Co. Inc. (800) 247-5008; sigmfg.com.

GLOBAL HOBBY

AVANCE

Wingspan: 57 in.
Engine req'd: .46 2-stroke or .61 4-stroke
Engine used: .46 Magnum XLS
Price: $189.99
Why we like it: a step above the typical fun-fly model, this well-constructed, all-wood kit comes completely covered and has a complete hardware package. The model is ideal for those who want a lightweight, straight and true aerobat.

Hits
- Easy to assemble.
- Clear cowl-cutting template included.
- Factory-installed retracts.

Misses
- Instructions could be more detailed.

Global Hobby Distributors (714) 963-0329; globalhobby.com.

LANIER RC

CAP 232

Wingspan: 80 in.
Engine req'd: 1.5 to 3.2ci 2-stroke, 1.6 to 3.0 4-stroke
Engine used: Fox 3.2 gasoline
Price: $420
Why we like it: a great starting point for IMAA aerobats, the CAP 232 is quick to build and looks great when finished. It's extremely aerobatic and includes a complete hardware package.

Hits
- High-quality, American-made hardware.
- Great looks.
- Excellent flight performance with great low-speed stability.

Misses
- The paint on the engine cowl was chipped.

Lanier RC (770) 532-6401; lanierrc.com.

GREAT PLANES

1/3-SCALE PITTS SPECIAL

Top wingspan: 68.5 in.
Bottom wingspan: 64.3 in.
Engine req'd: 2-stroke 1.6 to 2.7ci (26 to 45cc) glow engine, or 2.5ci (41cc) gas engine
Engine used: Fuji 50cc
Price: $399
Why we like it: perhaps the best biplane of the year, this kit goes together easily—and in less time than you'd think. All the parts fit precisely, and all alignment holes are already drilled to make assembly fast and easy.

Hits
- Great value.
- Beautifully covered.
- Super flight characteristics.

Misses
- No instructions or suggestions for gasoline-engine installation are supplied.
- Harder plywood is needed in firewall.

Great Planes Model Mfg. Co. (800) 637-7660; greatplanes.com.

NORTHEAST SAILPLANE PRODUCTS

ACCORD II

Wingspan: 36 in.
Power system used: Speed 480 motor with 2.33:1 gearing and an APC 10x7 prop
Price: $139.95
Why we like it: who says electrics have to be docile? This fast-building electric model can be in the air in almost no time. All the parts fit together precisely, and radio-gear installation is a snap! But the Accord II's flight performance is by far its most impressive feature.

Hits
- High-quality parts.
- Easy to build.
- Excellent flight performance.

Misses
- None.

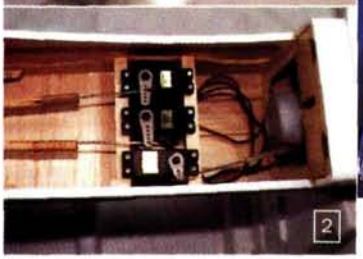
Northeast Sailplane Products (802) 655-7700; nesail.com.

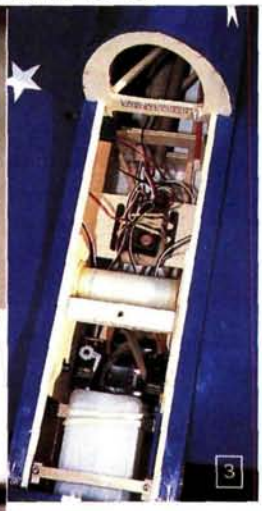
SETTING UP FOR AEROBATICS

FLYING AEROBATICS is a great way to improve your piloting skills. A certain amount of discipline is required, but the payoff is gaining smoother, more precise control. You learn to think ahead and to act instead of react to what your model is doing. With improved skills also comes increased confidence in yourself and an extra margin of safety. Here are some fundamentals to build your aerobatic skills on.

- Make sure that your engine is properly broken in; it should idle reliably and have smooth throttle response. An onboard glow igniter is a good way to improve engine reliability.
- Make sure that your fuel system operates properly and that the fuel lines are not kinked or pinched within a tightly fitting engine cowl.
- Use foam rubber to wrap your radio equipment and secure the receiver and battery pack in the fuselage. Aerobatic maneuvers produce high-G forces and can cause the radio gear to shift out of place. If this happens, your model's balance can be affected; worse, a battery or servo connector could come loose!
- Use the proper servos. Aerobatics requires stronger, faster servos than sport flying does. The servo's ability to center precisely is also important for consistent control. Follow the model manufacturer's recommendations when you choose your servos.
- Because of the higher current drain caused by the servos, a larger airborne battery pack is also recommended. To play it safe, use at least a 1000mAh pack.
- Install slop-free control linkages. If your control linkages have too much play, it will be almost impossible to hold a precise line throughout a maneuver. Solid controls also minimize the chances of control-surface flutter, which can cause your model to crash.


1


2


3

1. All aerobatic models require a properly broken-in engine that runs consistently and idles reliably. Make sure that all fuel and vent lines are secure and that they aren't rubbed or pinched within the engine cowl.

2. Don't skimp here! Match your servo's power output to the size of your aircraft. Reliable centering performance is very important to smooth control.

3. Aerobatic planes pull pretty big G forces, so make sure that your gear stays put. If your radio gear moves around, your model's balance can be affected; worse, it could cause a servo or battery lead to come undone.

- Seal your hinge gaps. Simply adding a strip of covering film over the hinge gaps will greatly increase control efficiency. Stopping airflow between the hinges also reduces the chance of flutter. Clear plastic tape can be used to seal the gap, but make sure that the seal doesn't hinder the control surface's ability to move.
- Balance your model properly. You won't be able to control it correctly if it's too nose- or tail-heavy. Add weight, or move the radio equipment around until the model balances within its proper balance range.
- Make sure that your model is trimmed for straight and level flight before each maneuver. As fuel is consumed, the model's trim will change, and it will become more tail-heavy. Even temperature changes can affect your model's trim. Plastic pushrods can expand and contract, thereby changing the trim settings. Always check the model for hands-off, straight-and-level flight.

If you are new to aerobatic flight, compile a checklist of the fundamentals so you don't forget them. In aerobatics, details mean the difference between a good flight and a winning performance!

IN-FLIGHT FIXES

Before you test-fly a model, make sure that its parts are properly aligned. Its wings should be square to the fuselage, the horizontal stabilizer should be parallel with the wings, and the vertical fin must be at 90 degrees to the stabilizer. Wing incidence, engine side- and downthrust and the CG should all be set to the manufacturer's recommendations. Do a range-check to ensure that the radio is operating properly and that the controls have been properly hooked up and move in the correct direction.

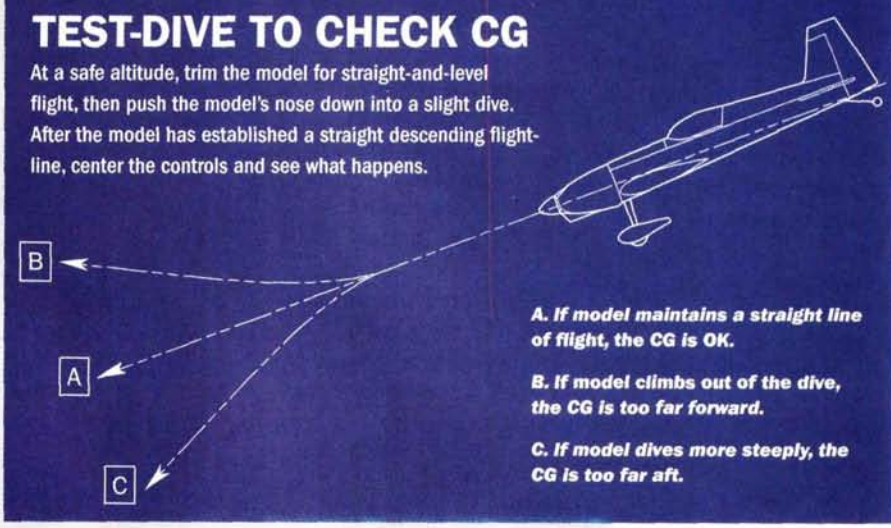
Test-fly your model on a calm day; wind can affect flight reactions and control response. Climb to a safe altitude, and trim the model for straight-and-level flight at about ½ throttle. Throttle back slightly, lower the nose and put the model into a shallow, 30-degree dive. Center all the controls, and see what happens. If the model maintains a straight, shallow dive, the plane's CG is very close to where it should be. If the nose rises quickly, the CG is too far aft (nose-heavy). If the model noses downward into a steeper dive, then the CG is too far forward (tail-heavy). Land the model, and adjust the CG appropriately; then test-fly the model again.

ADDITIONAL CG TESTS

- Roll the model into a 90-degree banked turn, and note what it does. If the nose drops, add tail weight. If the tail drops, add nose weight.
- Roll the model into sustained inverted flight. If you have to use a lot of down-elevator to hold level flight (more than 10 percent), you must add tail weight. If you have to add up-elevator to hold level inverted flight, you must add nose weight. Add weight in small increments, and check the balance each time by performing the same test maneuvers.

TEST-DIVE TO CHECK CG

At a safe altitude, trim the model for straight-and-level flight, then push the model's nose down into a slight dive. After the model has established a straight descending flightline, center the controls and see what happens.



A. If model maintains a straight line of flight, the CG is OK.

B. If model climbs out of the dive, the CG is too far forward.

C. If model dives more steeply, the CG is too far aft.

IN THE WORKS

We were still compiling this list of aerobatic ARF aircraft as presstime neared, and we ran out of time; below are a few that we surely would have included if we had flown them. Look for reviews of these beauties in future issues.

GREAT PLANES VENUS .40

The Great Planes Venus .40 is an all-around excellent sport-pattern ship that will make any pilot look good!

HANGAR 9 80-INCH CAP 232

An all-time favorite, this 80-inch CAP 232 is the third in the Hangar 9 line. It's an awesome performer that's ideal for 3D aerobatics.

DAVE PATRICK MODELS .40-SIZE ULTIMATE BIPE

This bipe is a carbon copy of the very popular, 1.20-size Dave Patrick Ultimate biplane; it's just smaller. It provides the same high-quality performance in a .40-size package. ✈

INDEX OF AEROBATIC ARF REVIEWS

Over the past three years, *Model Airplane News* has reviewed a lot of aerobatic ARF models and has evaluated their flight characteristics. Here's an index of those aerobats and the issues the reviews appeared in.

MANUFACTURER	MODEL	ISSUE DATE
Scale models		
Sig Mfg.	CAP 231EX	01/01
Lanier	Staudacher S600	02/01
MRC/Altech	EZ Extra 330L	03/01
Yellow Aircraft	Sukhoi SU-31m	05/01
Dave Patrick Models	Ultimate Bipe 120	08/01
Yellow Aircraft	CAP 232 .60	10/01
Hangar 9	Sukhoi SU-31 ARF	11/02
Kyosho	SU-31 Sukhoi	01/02
Lanier	Edge 540T	02/02
The World Models	Super Chipmunk	05/02
Super Kraft	Staudacher GS300	05/02
Lanier	CAP 232	07/02
Hangar 9	CAP 232 .40	09/02
Kyosho	Pitts Special S2-C	10/02
Hangar 9	1/3-scale Sukhoi	11/02
Great Planes	Giles 202 120	11/02
Great Planes	1/3-scale Pitts Special	02/03
Sig Mfg.	SU-31 Sukhoi	02/03
Lanier	Citabria	03/03
Super Kraft	Laser 2000	03/03
Yellow Aircraft	CAP 232 .30-size	04/03
Great Planes	1/4-scale Extra 300	06/03
Hangar 9	Clipped-wing Taylorcraft	12/03
Sport models		
MRC/Altech	EZ Stingray	07/01
Kyosho	Majestic 1400	03/02
Hangar 9	Aresti 40	06/02
Sig Mfg.	Somethin' Extra	06/02
Great Planes	Dazzler .40	08/02
Hangar 9	Pizazz 3D .40 - .60	10/02
Global	Avance	01/03
Hangar 9	Ultra Stick .60	03/03
Esprit Models	Diabolic 3D	05/03
Electric models		
Hobby Lobby	Firecat	04/02
Northeast Sailplane Products	Accord II	01/03
Northeast Sailplane Products	Acrophat	05/03

SCALE MASTERS CHAMPIONSHIP
DUEL IN THE

Above, left to right: Shailesh Patel's T-33A was built from a Jet Model Products kit. The paint job and markings were outstanding, and he was awarded Best Markings for his effort. The jet was able to land on a somewhat short runway without any problems. ■ Jay and Jack Steward's Nieuport 28 C-1 just edged out the Parker-Ledson Nieuport 17 for 3rd place in Team. ■ Robert Francis represented the aerobatic segment with his unique Turbo Raven. ■ This is the third championship for Jeremy Fursman's Tiger Moth. It placed 7th in 2000, 1st in 2001, and 5th in 2002. Jeremy also took the Most Realistic Flight award in Expert class. He didn't fly too fast and was able to do level-flight loops. He was the only contestant to do a 3-turn spin perfectly every time—recovering about 25 feet from the ground. The tiger paint job always gets the spectators' attention. ■ The fine detail work on Mel Santmyers' Stinson SR9 netted him a strong static score.

PHOTOS BY JERRY NELSON

DESERT

by Jerry Nelson

The 23rd annual U.S. Scale Masters Championship was held at the Arizona Model Aviators R/C club's excellent Superstition Airpark in Mesa (near Phoenix), AZ. The Scale Masters is truly one of the premier RC competitions, and what makes it so prestigious is the contestant-selection process. A series of 22 qualifying competitions was held in the USA, Puerto Rico and Canada, and the top 30 percent of the contestants were eligible to participate in the Championship. More than 100 modelers qualified, and 57 trekked to Mesa to compete.

The Arizona Model Aviators club members ran a very well-organized and professional event. The club also secured two new sponsors—Boeing and Southwest Airlines. It is great that these companies are taking an interest in RC modeling. Weather was fine for the entire competition; neither wind nor heat was a concern, and all five scheduled rounds were flown.

This Team Scale entry Ercoupe (flown by the Jones team) is typical of all the great-looking models flown at this year's Scale Masters event. Its natural-aluminum finish and military markings set it apart from the usual civilian paint schemes.

THE RULES

The Scale Masters competition has two classes: Expert and Team Scale. In Expert, the builder and flier are the same person, whereas Team Scale is set up so the builder can have someone else fly the model for him. This year, there were 45 entrants in Expert and 12 in Team Scale.

The competition consists of two programs: the static judging scores the workmanship and scale accuracy of the model, and it is followed by the flight performance. Numerous individual items are judged on a zero-to-10 scale for a possible score of 100 points for each program. This gives a maximum possible score of 200 points—100 for the static score and 100 for the average of the best three flights.

The static judging is done the day before the flying, and this year it took place at the Champlin Fighter Museum—a wonderful setting for displaying all the contestants' models. The static score is divided into three primary categories: accuracy of outline, color and markings and craftsmanship. The judging is a time-consuming process; the judges take their time to get it right, and scoring the 57 airplanes lasted all day. An interesting detail in the rules is that the static scores are not posted until after the first round of competition flying.

The flight score consists of a series of two required and seven optional maneuvers and flight realism. A figure-8 and an inspection pass compose the required maneuvers, and the other seven can be anything the pilot chooses, as long as the maneuvers can be judged accurately and are typical of those that the full-scale aircraft would perform. Piper Cubs do gentle turns and perhaps a spin or a loop; aerobatic aircraft do loops, snaps and rolls; bombers drop bombs. Common maneuvers performed by pilots are touch-and-go's, go-arounds and low-speed flybys with gear and flaps down. Takeoff and landing is not necessarily a judged maneuver, but many pilots choose it for judging.

The realism of flight is scored from zero to 10. Factors to consider are the impression of scale airspeed, rate of climb and descent, selection of flight maneuvers and takeoff and landing characteristics.

Winning scores from the two programs are usually in the range of 190 to 195 points; this year's winning Expert score was 192.083 by Kent Walters for his truly outstanding SBD-3 Douglas Dauntless.

Left, top to bottom: ■ This Nieuport 17 was fielded by the team of Gary Parker and Len Ledson and took 4th place. ■ Eugene Job's Hawker Sea Fury flies consistently in all weather. Previous winner of the 1996 and 1997 Scale Masters, it netted Pilots' Choice Best Military Aircraft this year. ■ Shailesh Patel's T-33.

HIGHLIGHTS

When the dust settled, Kent Walters and his Dauntless took home the top prize, but many other impressive aircraft gave Kent's Dauntless a run for the top spot.

Ramon Torres Sr. was second in Expert with his ⅛-scale, 91-inch Beechcraft Baron Twin. With two YS63 4-stroke engines, it weighed 20 pounds and was covered in lightweight fiberglass and finished in Nelson Hobby U.S. Army white and olive-drab paint. Ramon's flight performance was impressive—as was the sound of those two 4-stroke twins!

First place in Team Scale went to the father-and-son team of Ramon Torres Sr. and 15-year-old Ramon Jr. Ramon Jr. flew his dad's beautiful Beechcraft T34-C and earned the best average

When John Mota and Frank Banks flew their P-38, everybody watched. The workmanship was excellent; the warbird taxied back with both Zenoah G-45 engines running every time. The big twin won Team Most Realistic Flight and the prestigious overall Pilots' Choice Award.

Martin Hendrickson's Beechcraft T-34 model was very impressive on the ground and in the air. His weathering technique makes this model so interesting; he managed to simulate just a little bit of wear and tear on a relatively new airplane. The oil streaks around the hatches are very well done.

Team Scale flight score of 91.250 points (sixth best overall!). The Torres team's aircraft was Ramon Sr.'s own design—a ⅕-scale model with an 80-inch wingspan that weighs 20 pounds. It's powered by a YS140 engine and uses Futaba radio gear with 10 servos. The finish is fiberglass covered with Nelson Hobby paint in an interesting desert-tan camouflage.

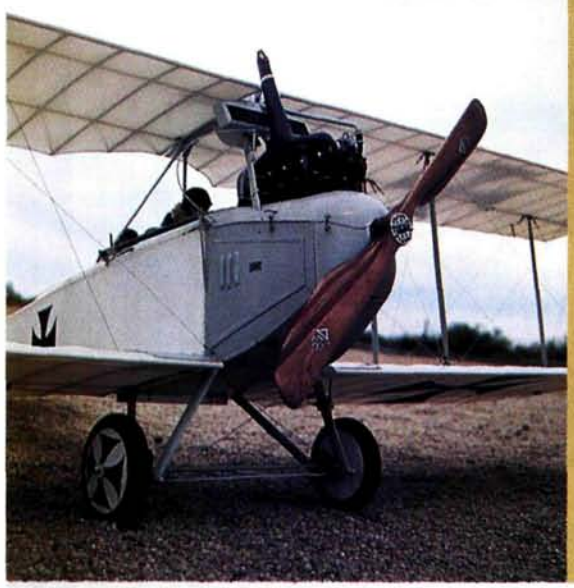
In second place were Eduardo Esteves and Ronaldo Salles from Brazil with their entry—Spacewalker—which had earned them first place in 2001. It is a highly detailed Sig ⅓-scale kit with a Precision Eagle 3.2 engine, and it's finished in Coverite dressed with enamel.

Kent Walters poses with his 1st-place Dauntless.

AND THE WINNER IS ...

Kent Walters' Dauntless earned an almost perfect static score of 98, which helped him take the top podium spot. The model is his own design, scratch-built to ⅐ scale, giving it a wingspan of 74 inches. Weight with an O.S. 1.80 is 23.3 pounds. He used a 16x6 prop and Cool Power fuel. The Dauntless is all balsa, covered with 0.6-ounce fiberglass cloth and epoxy resin; the finish is dope and lacquer. He uses a Futaba 9-channel radio with 10 servos. Operating features include his own-design retracts, special aluminum-covered upper dive flaps and lower flaps, operating LSO light, operating tailhook, working releasable bomb, flush and oval rivet detailing and panel lines. Kent figures it took him more than 2,000 hours to build the model. Kent took first in Expert, he shared the high static award with Ramon Torres' Beechcraft Baron. Kent's performance was outstanding; most takeoffs and landings were perfect—right down the runway's centerline. One of his more spectacular maneuvers was the bomb drop. He climbed high and pitched the model into an 80-degree dive—just as the full-scale Dauntless would be flown. At the last moment, he dropped the bomb on the "target." The judges liked his flying style and awarded him an average flight score of 94.083 (the second best). Kent also won the Best Single High Flight award and the Pilots' Choice award for having the best WW II aircraft at the competition.

Joe Topper's Proctor enterprises Junkers JU 52. ■ *Below left: John Cole's majestic, slow-flying WW I Brandenburg C-1 was extremely detailed. It easily earned the Best WW I aircraft award.* ■ *Ernest Harwood's WW I vintage Aviatik C-1 also earned a strong static score.*



THE FUTURE

At the banquet held at the Champlin Fighter Museum, Earl Aune—the chairman of the Scale Masters Association (SMA)—gave an interesting report on its status and future, concentrating on ideas to encourage participation in the sport. Given the explosive growth in ARF popularity in recent years, he advocated promoting the participation of ARFs in the Sportsman scale class at Scale Masters qualifiers. The Sportsman scale event does not have a "builder" rule, so ARFs are perfectly acceptable. Promoting ARFs would increase the turnout at the local level, and perhaps some of those who participate with ARFs will, in time, build their own models and then fly them in the higher levels of competition.

Aune also mentioned the possibility of adding a championship category for professionally built models. This would include model-industry manufacturers and their representatives, modelers with kits that have prefabricated wings and fuselages, and modelers who have purchased their models already assembled. The idea is to give a fair shot to individuals who build their own models by not having them compete directly against those whose models were partially or completely built and detailed by professionals.

Both of these proposals would increase participation in Scale Masters competitions at all levels and ensure the sport's popularity into the future.

This year was one of the few times that SMA chairman Earl Aune was able to fly in a championship. The contest was so well organized that Earl had the time to compete with his folding-wing Corsair that's an engineering marvel with its automatic, heat-operated cowl flaps. Earl even had a simulated operational radar screen in the cockpit. No surprise that he won the Engineering Achievement.

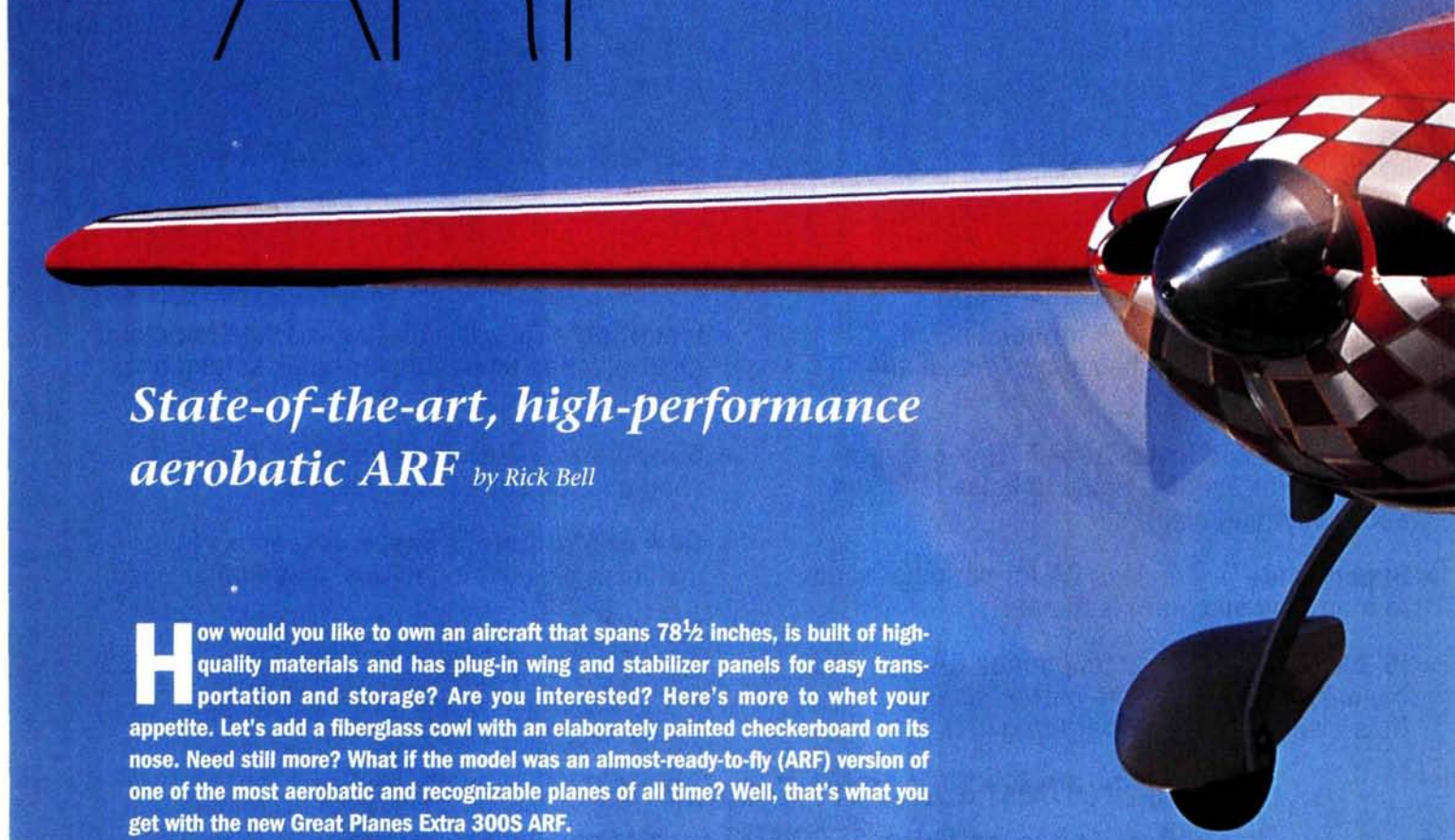
	WINNER	STATIC	FLIGHT	TOTAL SCORE	AIRCRAFT
EXPERT					
1	Kent Walters	98	94.1	192.08	SBD-3 Douglas Dauntless
2	Ramon Torres Sr.	98	90.7	188.67	Beechcraft Baron
3	Eugene Job	96	91.5	187.5	Hawker Sea Fury MK11
4	Gustavo Campana	94	93.1	187.08	ALCA L-159
5	Jeremy Fursman	92	94. 33	186.33	De Havilland DH82A Tiger Moth
TEAM					
1	Ramon Torres Jr. and Sr.	97	91.3	188.25	Beechcraft T34C-1
2	Eduardo D. Esteves, Ronaldo Salles	94.5	90.3	184.83	Spacewalker
3	Jay Steward, Jack Steward	93	90.83	183.83	Nieuport 28 C-1
4	Gary Parker, Len Ledson	93	90.8	183.83	Nieuport 17
5	Brian O'Meara	90	89.3	179.25	Kawasaki KI 61 "Tony"

CONCLUSION

Again, the Scale Masters Championship represented the pinnacle of scale model design and craftsmanship. Longtime principal sponsor Airtronics contributed greatly to its success. Airtronics awarded one of its top-of-the-line radios to each winner of the team events at the 22 qualifier competitions that were held around the country. For more information on this Championship and the next, check out scalemasters.org.

click trip MODELAIRPLANENEWS.COM TO SEE MORE PHOTOS OF THESE BEAUTIFUL SCALE MASTERS PLANES.

Great Planes Extra 300S ARF



State-of-the-art, high-performance aerobatic ARF by Rick Bell

How would you like to own an aircraft that spans 78½ inches, is built of high-quality materials and has plug-in wing and stabilizer panels for easy transportation and storage? Are you interested? Here's more to whet your appetite. Let's add a fiberglass cowl with an elaborately painted checkerboard on its nose. Need still more? What if the model was an almost-ready-to-fly (ARF) version of one of the most aerobatic and recognizable planes of all time? Well, that's what you get with the new Great Planes Extra 300S ARF.

Great Planes Model Manufacturing Co. has been a major player in the ARF market for a few years now, and the company really raises the bar with this, its best offering yet. Great Planes has accurately captured the sleek and purposeful lines of this aviation icon using traditional materials and construction techniques. Let's take a look at this much-anticipated model.

PHOTOS BY RICK BELL


GOODRICH
RELIEFBAND

A CLOSER LOOK

The Extra 300S requires very little time to assemble. All you'll need to finish the model are an engine (glow or gas), radio system, adhesives and the appropriate fuel lines for either glow or gas engines. The plane is constructed of balsa and ply and comes covered with MonoKote. The wing panels are the plug-in type and are secured by four ¼-20 nylon bolts from inside the fuselage. The three-piece stabilizer is somewhat unusual; two aluminum tubes run through the center section, and the outer panels are bolted to them. The kit includes CA hinges, painted aluminum landing gear, an adjustable engine mount, a fuel tank, painted fiberglass cowl and wheel pants, wheels, a painted canopy deck, a beautiful, polished-aluminum spinner, aluminum wing tubes, decals and a very generous hardware package.

The major parts come individually wrapped in cellophane bags, and I was very pleased to see that there were hardly any wrinkles in the covering. The instructions are what we've come to expect from Great Planes—a concise manual that's full of information and photos. To power the model, I chose a Fuji Engines BT-50SA gas engine.

ASSEMBLY

Wing. Before I begin any assembly, I like to make all of the necessary openings in the covering. I feel that it saves time, and it allows me to thoroughly examine all of the major parts. Assembly starts with the wing panels, but there isn't much to do here. Using the supplied CA hinge material, I test-fit the ailerons, and when I was satisfied with their fit, I secured them with liberal amounts of thin CA. Installing the aileron servos is next, and the hardwood servo mounts are recessed in the wing so that when the servos are installed, color-matched hatches cover them. Only the servo arms are exposed. A plane of this caliber and potential deserves high-quality servos, so I installed Futaba S9250 digital servos along with the control horns, and I made up the pushrods. The last detail was to epoxy the anti-rotation pins into each root rib, and the wing panels were finished.

One minor problem I encountered was the fit of the aluminum wing tubes; it was a little too tight in the wing panels. To improve the fit, I used a half-round Permagrit sanding stick. A few minutes spent sanding the insides of the wing tubes loosened things up nicely. When I talked to Great Planes about the problem, I learned that the cardboard tubes in the fuselage and wing panels are being changed to fiberglass to eliminate the fit problem.

SPECIFICATIONS

MODEL: Extra 300S ARF

MANUFACTURER: Great Planes Model Mfg. Co.

TYPE: giant-scale ARF

WINGSPAN: 78.5 in.

LENGTH: 70 in.

WING AREA: 1,180 sq. in.

WEIGHT: 16 lb., 8 oz.

WING LOADING: 32.22 oz./sq. ft.

ENGINE REQ'D: 1.60 to 2.10ci 2-stroke, 2.00 to 3.00ci 4-stroke, or 2.5 to 3.8ci gas

ENGINE USED: Fuji Engines BT-50SA 50cc

RADIO REQ'D: 4-channel with 7 servos (2 aileron, 2 elevator, 2 rudder, throttle; 8 if using a remote kill switch)

RADIO USED: Futaba 9C transmitter, FP-129DP receiver, 6 Futaba S9250 digital servos and 2 Futaba S9304 servos

PROP USED: Top Flite Power Point 20x10

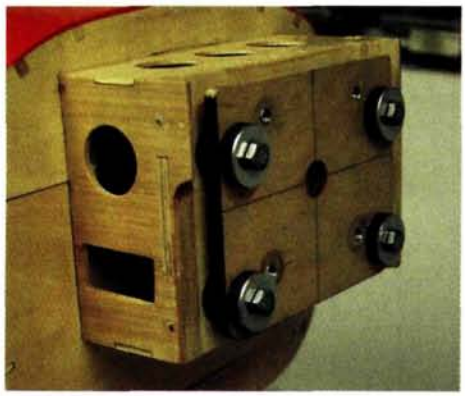
PRICE: $399

FEATURES: all-balsa and ply built-up construction covered in MonoKote; plug-in wing and stabilizer panels; painted fiberglass cowl and wheel pants; durable aluminum landing gear; polished-aluminum spinner; complete hardware package and detailed instructions.

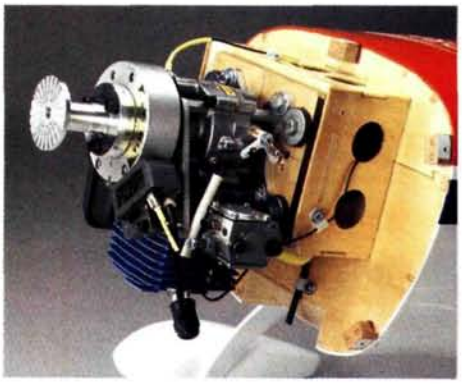
COMMENTS: the Great Planes Extra 300S is an astonishing ARF model that's easy to build, looks fabulous and flies even better than it looks. The Extra's high-quality materials and expert covering job will make it a must-have for any giant-scale enthusiast. This is a great model for IMAC aerobatics or hot-dog sport pilots.

HITS
- A+ quality and craftsmanship.
- Expertly covered in MonoKote.
- Superb flight characteristics.
- Everybody wants to fly it!

MISSES
- Wing tubes' fit was too tight.
- Canopy hatch color is darker than the fuselage covering.



Above: I used a Great Planes large-engine isolation mount to keep airframe vibration to a minimum. It takes only a few minutes to install and includes the hard rubber mounts and hardware. Below: there's plenty of room to mount the Fuji Engines BT-50SA. It's a good match for the Extra 300S and has power to spare.



Patty Wagstaff and the Extra 300S

by Budd Davisson

If you've seen her fly, you'll never forget it. She's razzle-dazzle personified. If you meet her and spend a few moments with her, you'll come away with much the same feeling. It will be obvious that the pilot fits the airplane. Or is it the other way around?

Patty exudes confidence laced with huge amounts of both zaniness and steely professionalism—all combined with a very clear-cut idea of who she is and what she wants. Catch her out of her element, however, and you'll find her quiet—almost shy—but always ready to flash that trademark smile that's as sincere as the woman herself. What you see in Patty is what you get: not one iota of pretense.

For well over a decade, her signature airplanes have been the sleek monoplanes designed by Germany's Walter Extra. First it was the 230, then the fire-breathing, one-of-a-kind 260, and now, the 300S—the single-seat version of the 300L.

Walter Extra himself is a world-class aerobatic competitor, so he knows what he wants in his airplanes, and he knows how to get it. In fact, full-scale, unlimited-category competition airplanes have a lot in common with today's RC pattern ships. They must roll quickly and have enormous vertical performance, and this requires lots of power but little weight. Furthermore, they must not break. Of course, the last two points—light weight and strength—represent two of the biggest compromises in aviation. It takes a clever mind to get both.

Extra's designs are an interesting combination of traditional technology and cutting-edge innovation. The fuselages are tried-and-true, chromoly steel-tube trusses—a concept that predates Tony Fokker's use of steel tubes in WW I. The wings, however, are true composite structures, in that the word "composite" means that more than one kind of material is used. In this case, it means that plywood ribs are combined with composite skins and spars to produce wings that handle 10G, plus and negative, with ease.

The cockpit redefines "fine quality": Walter Extra builds very well-detailed machines! The seat reclines just enough to be comfortable, yet it offers G resistance without introducing any kind of weirdness. The visibility on the ground is great, although the view straight ahead is totally obscured by the big Lycoming. The wing was mounted higher—in the middle of the fuselage—on the first two-place Extras (on which the 300L/S is based), and it effectively blocked all runway visibility during the landing flare.

In the air, the 300S is basically a bullet. It goes where you point it, and it does so immediately. The ailerons are extremely light and have little, if any, break-out force, or pressure "notch," that self-centers the stick and lets you know where neutral is. Ham-handed pilots will constantly fight themselves as they over-control first one way, then the other.

The airplane presents few limitations; in fact, the pilot is usually the limiting factor. Of course, when Patty takes off, even that limitation is removed, and the audience is given the rare opportunity to see aerobatics in the purest sense of the word.

[Editor's note: Budd Davisson, pilot extraordinaire and editor-in-chief of our sister publication, *Flight Journal*, has been a certified flight instructor for 35 years. He has logged more than 6,000 hours as a pilot and flown nearly 300 types of aircraft, including the Extra 300. He is a friend of Patty's and has interviewed her many times.]

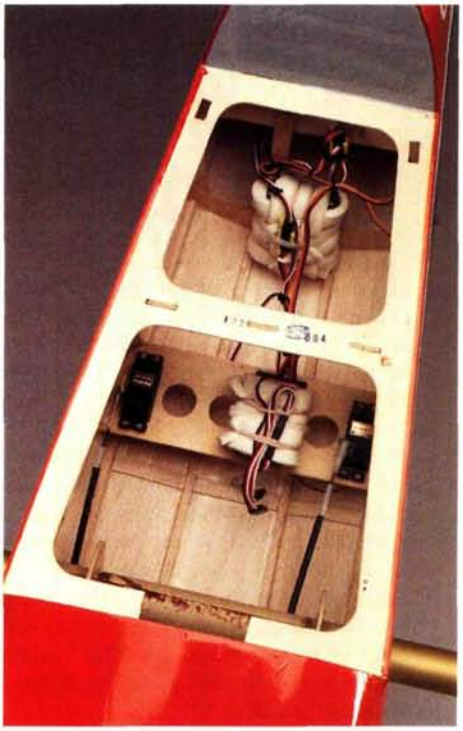
Fuselage. Again, there's very little to do. Have your engine of choice handy to keep assembly moving along. The first step in the manual is to install the servo tray (mine was installed at the factory, and I suspect that all of the kits out there are the same). The firewall and engine box are built into the front of the fuselage, but they need to be pegged using the included dowel material. It's nice to see this important step included for a plane of this size.

Installing the engine is straightforward, and many engines are suitable for this model. If you like, you can use a 1.60 to 2.10ci 2-stroke or a 2.00 to 3.00ci 4-stroke engine. As mentioned earlier, I went with the Fuji Engines BT-50SA gas engine. With its 3.2ci displacement, the Fuji was near the middle of the recommended gas-engine range of 2.5 to 3.8ci, and I felt it would be a good match for the model. I also used a Great Planes large-engine isolation mount and engine kill switch.

The manual shows in great detail how to install both glow and gas engines. I skipped right to the gas section, which shows the BT-50SA installation. Even though I used the isolator engine mount, installing the engine was a no-brainer. Next, I installed the throttle and kill-switch servos on the servo tray and fabricated the pushrods for each. I also plumbed the fuel tank with gas-compatible fuel tubing and installed the tank in the fuselage.

Mounting the cowl is about as easy as a task can get, and it took me only a few minutes. It lined up perfectly with the engine, and I only had to make a cutout for the spark-plug cap. If I hadn't used the isolation mount (which pushes the engine forward ½ inch), the cutout wouldn't have been needed. Don't forget to make an exit hole for hot air to escape through on the bottom of the cowl (the manual doesn't mention this). I decided to skip ahead and install the landing gear and wheel pants instead of waiting till later. I also installed a Sullivan tailwheel assembly.

Tail surfaces. Now that the front of the model has been completed, it's time to finish the back end. Start by fitting and aligning the stabilizer center section. The



With most of the servos mounted at the rear of the fuselage, there's a lot of room in the main radio compartment. The two servos are for the throttle and the remote kill switch. If you use a gas engine, be sure to use plastic pushrods on these servos; metal pushrods can transfer electrical noise to the receiver.

FLIGHT PERFORMANCE

The first flights took place on a sunny, cold day; the temperature was a balmy 16 degrees. The high- and low-rate control throws were set up as recommended in the manual. As with any new model I test-fly, I used the low rates for the initial flights. Before the first flights, I ran a few tanks of gas through the engine. It swung the 20x10 Top Flite Power Point prop at a rock-steady 7,000rpm.

TAKEOFF AND LANDING

The Extra taxies very well, and I flew it from both grass and paved runways. When on pavement, be ready to use rudder as necessary if you encounter crosswinds; there's a lot of side area there. Takeoffs are easy and short; the Fuji gets the Extra airborne in a hurry. Slowly advance the throttle, and keep slight backpressure on the elevator until moderate speed is reached. Release the backpressure, and the Extra becomes airborne by itself. When the Extra was flying, only a couple of blips of down-elevator were needed for straight and level flight. Landings are equally easy; just line it up on final, and let it settle into its groove. The Extra is very solid and shows no tip-stalling tendencies. Hold some throttle until you're over the threshold, and cut the throttle to idle; the Extra settles nicely for soft, 3-point landings. I also had the opportunity to test the plane's engine-out characteristics on the first flight. Not to worry, though; the Extra glides extremely well.

SLOW-SPEED PERFORMANCE

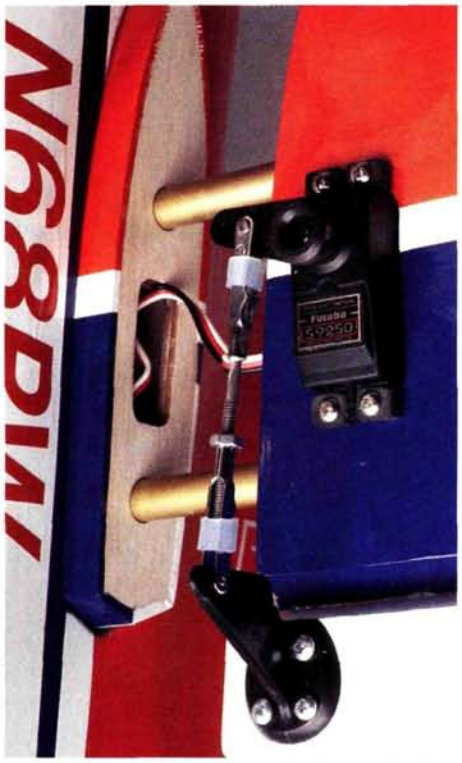
The Extra can be slowed to a crawl before it stalls. When it does stall, it's anti-climactic; you get good feedback from the controls as the model slows. Low-speed aerobatics are a lot of fun and are easily done.

HIGH-SPEED PERFORMANCE

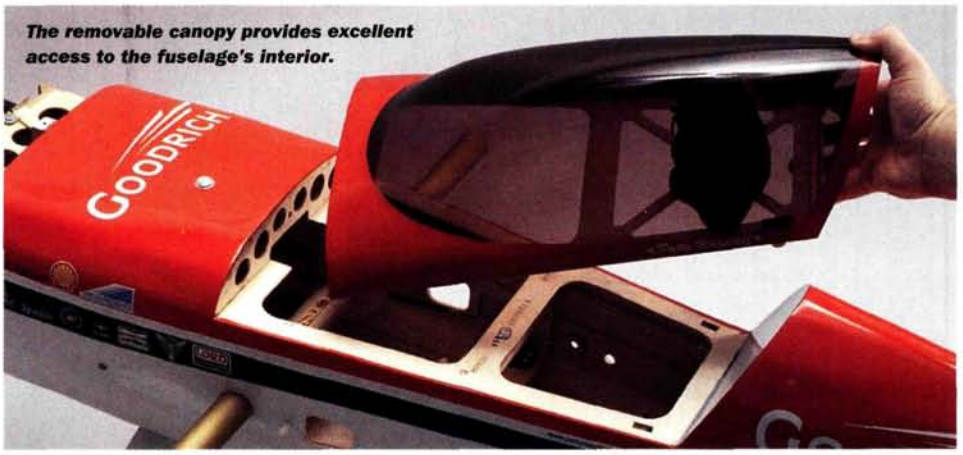
Nail the throttle to the firewall and be prepared; the Extra really moves out behind the big Fuji. No trim changes were noted between high and low speeds. The Extra grooves right along and is very responsive to control inputs. I recommend that you use a little exponential on the ailerons and elevator.

AEROBATICS

This is where the Extra excels! It tracks well in looping maneuvers, both inside and outside, rolls like a drill bit and tumbles like a circus acrobat. Inverted flight hardly requires any down-elevator. The Extra knifes well, and there is almost no pitch coupling. Snap maneuvers can be as gentle or as violent as you want; either way, it will stop on a dime. As with all giant-scale aircraft, throttle management is mandatory to help prevent flutter. The Great Planes Extra is one smooth flying aerobat that makes you look like a pro!



Each elevator requires a servo that's installed on the underside of the stabilizer. Two screws release the stabilizer for easy transportation and storage. The rudder uses two servos in a push/pull arrangement for precise control. The other servo is mounted on the other side of the fuselage.



The removable canopy provides excellent access to the fuselage's interior.

Above: I used a ¼-scale Extra 300 rub-on vinyl graphics set to enhance the kit-supplied decals. They're available from Model Graphics, as is the female pilot figure that I used. Left: the supplied fiberglass cowl is absolutely gorgeous, and this is how it looks right out of the box! Check out that polished spinner; it really sets off the front of the model.

opening for it in the fuselage was a little tight and needed to be sanded a bit to open it up. Once it had been fitted, I epoxied it into place after I removed the covering for a secure bond. The two elevator servos are installed on the underside of each stabilizer half, and the servo leads are snaked through the center section and into the fuselage. Because the servos are in the stabilizer halves instead of in the fuselage, it's easy to remove them for transportation and storage. Again, I used Futaba S9250 digitals for the elevators and rudder. You'll need 4 servos here—1 for each elevator and 2 for the rudder.

Before I glued in the stabilizer center section, I installed all of the components in the plane as if it were ready to fly so I could balance it. I knew the plane was going to be nose-heavy because the engine is mounted a little farther forward. A cavity under the stabilizer center section in the very rear of the fuselage makes a great place to add weight. I needed to add 5 ounces of lead to move the CG back.

The rudder uses two servos in a push/pull configuration, and setting it up is pretty simple. It isn't necessary to reverse one of the servos to make it work correctly; just make sure that the pushrods are exactly the same length to avoid stalling the servos.

FINAL DETAILS

Now it's time to button up all of the little details to finish off the model. Because the plane had already been balanced, all of the radio components, the pilot figure and other miscellaneous odds and ends were in place, and all I had to do was secure the canopy and apply the graphics. The canopy is a molded one-piece unit, and when removed, it allows a lot of access to the interior of the fuselage. It's secured with two sheet-metal screws and painted to match the fuselage. Unfortunately, its color is darker than that of the fuselage. I noticed that the paint was applied directly to the plastic; if a white primer had been used first, the color match might be better.

The self-adhesive graphics contain a lot of clear material between the letters. You could carefully cut this away, but it would take a lot of time, and correctly placing the letters individually would be challenging. You could also do what I did: get a set of vinyl graphics from Model Graphics. These rub-on vinyl graphics have no clear backing between the letters, are easily applied and look outstanding on the model.

My female pilot figure also came from Model Graphics. I set up the control throws as recommended in the manual and gave the model a final check. With everything in order, the Extra was ready to go.

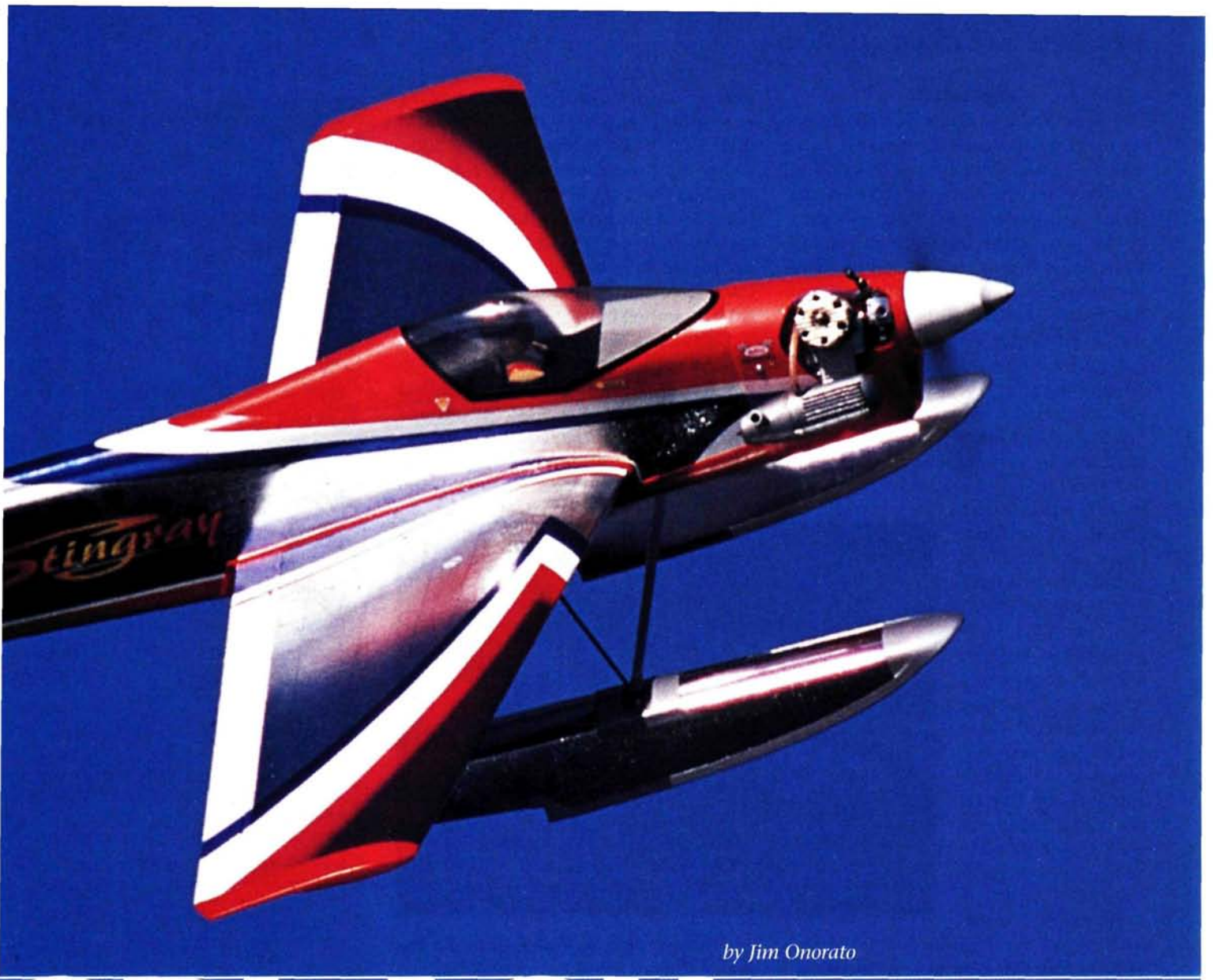
HAPPY ENDINGS

The Great Planes ¼-scale Extra 300S ARF is quite an impressive model and good value for the money. It's very well constructed and nicely covered. Assembly is very quick and easy; I started on a Saturday morning, and by Sunday evening, it was flight-ready. I really love the way the model looks—it draws a lot of attention on the flightline—but I like the way it flies even better. The Great Planes Extra would be a great choice for IMAC events and for sport fliers who want a little "extra" to put on an airshow. ✈

Fuji Engines; *distributed by Great Planes; fujiengines.com.*
Futaba Corp. of America; *distributed by Great Planes; futaba-rc.com.*
Great Planes Model Distributors Co. *(800) 637-7660; greatplanes.com.*
Model Graphics; *distributed by Cajun R/C Specialties (337) 269-5177; cajunrc.com.*
Sullivan Products *(410) 732-3500; sullivanproducts.com.*
Top Flite; *distributed by Great Planes; top-flite.com.*

About two years ago, OK Model Co. introduced an aerobatic pattern model called the Stingray as part of its "EZ" line of ARFs. It was such a great-flying airplane and so well received that the company decided to produce a seaplane version—the Stingray Splash. The Splash is virtually identical to the original Stingray with two exceptions: the wheels have been replaced by floats, and the vertical stabilizer is mounted on the bottom of the fuselage and a small dorsal fin sits on top of the tail. Like other planes in the EZ line, it is available in the U.S. from Altech Marketing and features OK's patented laminated skin over wood structure. The laminated skin is made of a special plastic foam base, a synthetic paper layer that has the graphics printed on it and a layer of clear Mylar to protect the surface from fuel and cleaning products. The lamination allows very impressive graphics while keeping weight to a minimum. I'm happy to report that the Stingray's beauty isn't just skin deep; it delivers excellent performance as well.

MRC/ALTECH STINGRAY



by Jim Onorato

SPLASH

An aerobatic ace with floats!

THE KIT

When you open the box, the first thing you notice is the Splash's shiny covering. It is finished in metallic red and blue chrome and has white control surfaces. The graphics are typical of the EZ line—bright and colorful, and the chrome really stands out! Assembly is typical EZ as well; the Splash is 90-percent complete and includes most of what you need to get flying (you supply the radio, engine, fuel tubing and a propeller). A pilot figure is even included! Control horns, clevises and other plastic parts all come on a molded "tree" that also contains a few parts that aren't used (most likely, the company uses one tree for several models). The ailerons are already hinged and glued with almost no gap. A fuel tank, plastic cowl, engine mount, spinner, pushrods, tinted canopy and a complete hardware package (with metric nuts and bolts) are all included. The floats are built (except for the strut mounts and covers) and are made out of the material used for the rest of the plane.

The 23-page instruction booklet from the original Stingray kit is accompanied by an 8-page supplemental foldout that covers the construction steps that are unique to the Splash. Both are filled with excellent photos and adequate written instructions. All dimensions are given in millimeters.

ASSEMBLY

The Splash wing comes in halves and requires a single servo for the strip ailerons. The aileron pushrods are made of 1.8mm music wire that is threaded on one end. I used L-bends with snapper-keepers at the servo ends rather than making Z-bends as called for. I used short pieces of fuel tubing to keep the plastic clevises at the control surface ends closed rather than use the nylon rings provided.

I joined the wing halves using 30-minute epoxy on the center ribs and the laminated lite-ply and balsa wing joiner. Both the lite-ply center ribs have a tab that locks the wing's leading edge into the fuselage. The wing joiner fit snugly in the wing-joiner pockets. The instructions call for 5mm dihedral at each tip; I just made sure that the root ribs were glued tightly together without gaps, and I let the dihedral angle be whatever it came out as. It looked pretty close when the epoxy cured. I taped the plastic top center wing cover into place and glued it with thin CA at the edges. Be very careful when using CA; if you get any of it on the exposed foam edges of the laminated skin, it will dissolve the foam.

The wing-bolt mounting plate is three die-cut pieces of lite-ply that I laminated together using medium CA. I installed the blind nuts and epoxied the plate into the fuselage. After making sure that the wing was perfectly aligned with the fuselage, I drilled the holes for the mounting bolts, added the lite-ply reinforcing plate and attached the wing with two 4mm steel bolts. The joint between the wing saddle and the wing was perfect! I then glued on the plastic wing bottom cover with thin CA and cut holes to allow access to the wing-mounting bolts.

I attached the radial, metal engine mount to the firewall using the 3mm bolts threaded into the blind nuts that came installed; I angled the mount approximately 45 degrees from vertical. I placed the engine temporarily on the mount at the prescribed distance from the firewall (4¾ inches) and drilled the plates to match the Enya 50CX engine. Next, I assembled and installed the fuel tank and fittings. The tank fit nicely in the fuselage former with the pick-up and vent tubes protruding through the firewall.

The Enya 50CX is strong enough to get the Splash up quickly off the water. I trimmed the cowl in such a way as to allow the engine to be removed with the cowl in place.

The radio gear sits nicely in the factory-installed servo tray. Note that each elevator half has its own pushrod.

SPECIFICATIONS

MODEL: EZ Stingray Splash

MANUFACTURER: OK Model Co. Ltd.

DISTRIBUTOR: MRC/Altech

TYPE: aerobatic ARF seaplane

WINGSPAN: 52.4 in.

WING AREA: 530 sq. in.

AIRFOIL: symmetrical

WEIGHT: 5 lb., 11 oz.

WING LOADING: 24.7 oz./sq. ft.

LENGTH: 50.6 in.

RADIO REQUIRED: 4-channel with 4 servos (elevator, rudder, throttle, aileron)

RADIO USED: Futaba Conquest 4-channel with four 3003 standard servos

ENGINE REQ'D: .40 to .45ci 2-stroke or .50 to .70ci 4-stroke

ENGINE USED: Enya 50CX 2-stroke

PROPELLER: Master Airscrew 11x7

FUEL: 15% Wildcat

STREET PRICE: $299

FEATURES: includes floats; patented triple-layer outer skin over inner wood frame; plastic cowl; tinted molded canopy; all necessary hardware; spinner; fuel tank; and pilot figure.

COMMENTS: adding floats to an aerobatic pattern model is a very interesting project. The Splash has all the excellent flight characteristics of the Stingray and adds the excitement of float flying.

HITS

- Excellent flight performance.
- Ease of assembly.
- Completeness of kit.
- Nice covering.

MISSES

- Floats are not watertight.

The plastic cowl has molded-in cut lines for the engine opening. After cutting out the opening, I attached the cowl to the firewall with four self-tapping screws. I made the opening for the engine large enough to allow the engine to be installed and removed without my having to remove the cowl. I then installed the engine, the prop and the included plastic spinner.

Four prebent struts are used to attach the floats to the wing. I placed the struts in the slots in the underside of the wing and fastened each one with two plastic straps held with self-tapping screws. I then epoxied the

The Splash's upside-down rudder may look odd, but it performs quite well both in the air and in the water.

four lite-ply strut-mounting plates to the floats, added the plastic covers and attached the floats to the struts using the metal straps and self-tapping screws provided. I attached the aluminum cross-brace to the front struts to prevent the floats from spreading. When set up, the floats have a slight negative incidence relative to the wing and are positioned with the step slightly forward of the aircraft's center of gravity; the instructions give all the necessary dimensions.

I mounted three standard servos in the factory-installed servo tray and made the rudder and elevator pushrods according to the instructions. Each elevator half has its own pushrod, and I connected the two at the servo end with the fittings provided. To prevent the pushrods from flexing, be sure to install the pushrod brace where indicated in theinstructions.Plastic pushrod exit fittings minimize the likelihood of water getting in at the pushrod exits.

Next, I epoxied the stab and fin to the fuselage. The Splash's stabilizer is in the usual place, but the fin is installed on the bottom. I attached the plastic dorsal fin to the top of the fuselage. I removed the covering where the control horns are attached to the elevators and rudder and replaced it with pieces of die-cut lite-ply. I then applied aluminum stickers over the lite-ply. The hinge points on the elevator and rudder are already installed in and glued to one surface. I used epoxy to attach the elevator hinge points to the stab after I had applied petroleum jelly to the pins to prevent the epoxy from sticking to them; I attached the rudder in the same way. I then attached the control horns and connected them to the pushrods.

Finally, I applied the decals and installed the pilot figure and canopy. The pilot is made of really thin plastic, and it was a bit of a job to get his head halves together. Now that he has been painted, though, he looks pretty cool with his shades and '50s hairdo.

FINAL THOUGHTS

The Splash is a well-made ARF that went together easily and looks very slick. If you have experience with pattern airplanes and have wanted to try float flying, OK Model Co.'s Stingray Splash may be just what you've been waiting for. ✈

MRC/Altech *(732) 225-6144; modelrectifier.com.*

Enya; *distributed by MRC/Altech.*

Futaba Corp. of America; *distributed by Great Planes Model Distributors Co. (217) 398-8970; futaba-rc.com.*

Master Airscrew; *distributed by Windsor Propeller Co. (916) 631-8385; masterairscrew.com.*

Wildcat Fuels *(859) 885-5619; orders only (888) 815-7575; wildcatfuel.com.*

FLIGHT PERFORMANCE

My favorite RC activity is flying off water so I was eager to get the Splash to the lake. I set my transmitter up to give the recommended throws for high rate, and I set the low rates at 60 percent. The initial flight was at low rate.

TAKEOFF AND LANDING

The Splash's "upside-down" rudder is quite effective during taxiing. When the Splash is at rest on the water, about 1 inch of the tip of the rudder is underwater. On calm water, the Splash moves smoothly and gets airborne without much effort. With any sort of chop, however, the tips tend to dig in, and the spray slows the prop and makes takeoff difficult. On these occasions, I simply hold the tail, run up the engine and then let the plane go—and go, it does! The Enya 50CX really gets it airborne quickly.

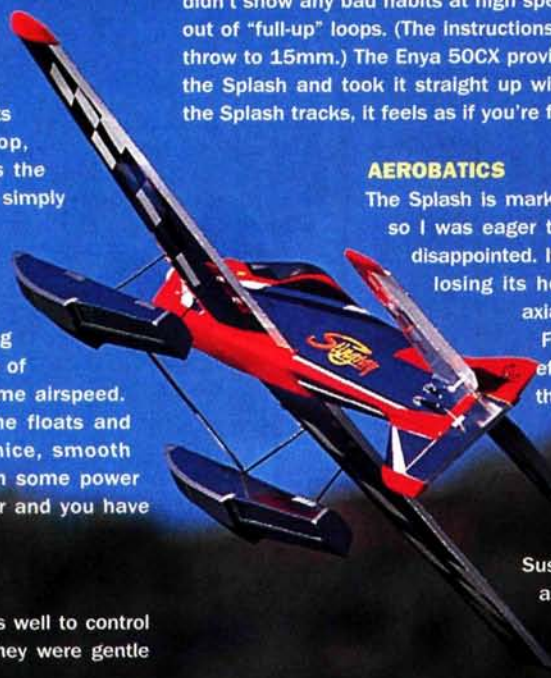
The Splash has a very shallow glide slope that makes landings a real pleasure. I usually set up a long approach and then throttle down to establish the rate of descent while using slight up-elevator to bleed off some airspeed. By maintaining a slightly nose-high attitude, I get the floats and rudder to touch the water at the same time for nice, smooth landings. As with any floatplane, you should maintain some power when landing in case the plane bounces off the water and you have to throttle up quickly to get it flying again.

LOW-SPEED PERFORMANCE

The Splash handles very well at low speed and responds well to control inputs. When I forced a few stalls at a safe altitude, they were gentle and, almost always, straight ahead. It sometimes dropped its right wing, but the stalls were never violent.

HIGH-SPEED PERFORMANCE

At full throttle, the Splash flies really fast and is very responsive. It didn't show any bad habits at high speeds other than a tendency to roll out of "full-up" loops. (The instructions caution you to limit the elevator throw to 15mm.) The Enya 50CX provided more than enough power for the Splash and took it straight up without much effort. With the way the Splash tracks, it feels as if you're flying a much larger airplane.



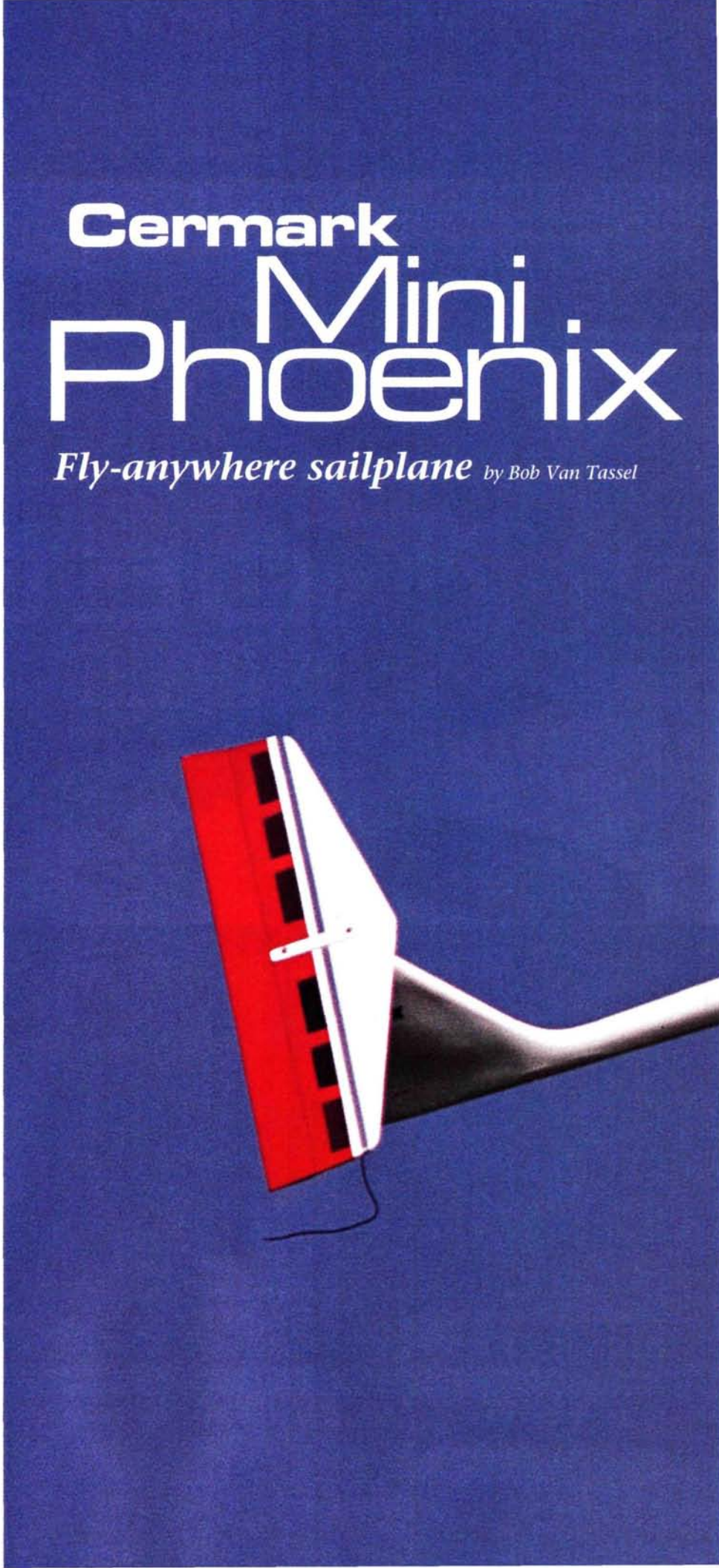
AEROBATICS

The Splash is marketed as an "aerobatic seaplane," so I was eager to see what it could do. I wasn't disappointed. It did graceful, large loops without losing its heading, and its rolls were quite axial—just a little fast at the bottom. Floats usually create a "pendulum" effect during rolling maneuvers, but the Splash's floats are light enough to minimize this. Four-point rolls and snap rolls were very crisp, and inverted flight required just a hint of down-elevator to maintain altitude. Sustained knife-edge was a breeze, as were outside knife-edge circles. Spins were graceful and recovery was immediate.

Cermark Mini Phoenix

Fly-anywhere sailplane by Bob Van Tassel

For years, sailplanes have been considered limited in terms of where they can be flown. But the recent emergence of smaller models that can be easily assembled and transported has opened the world of sailplanes to just about anyone. A smaller version of the already popular Phoenix—the new Mini Phoenix from Cermark—shares more than just a name with its larger brother; it also features the same outstanding performance and high-quality craftsmanship.

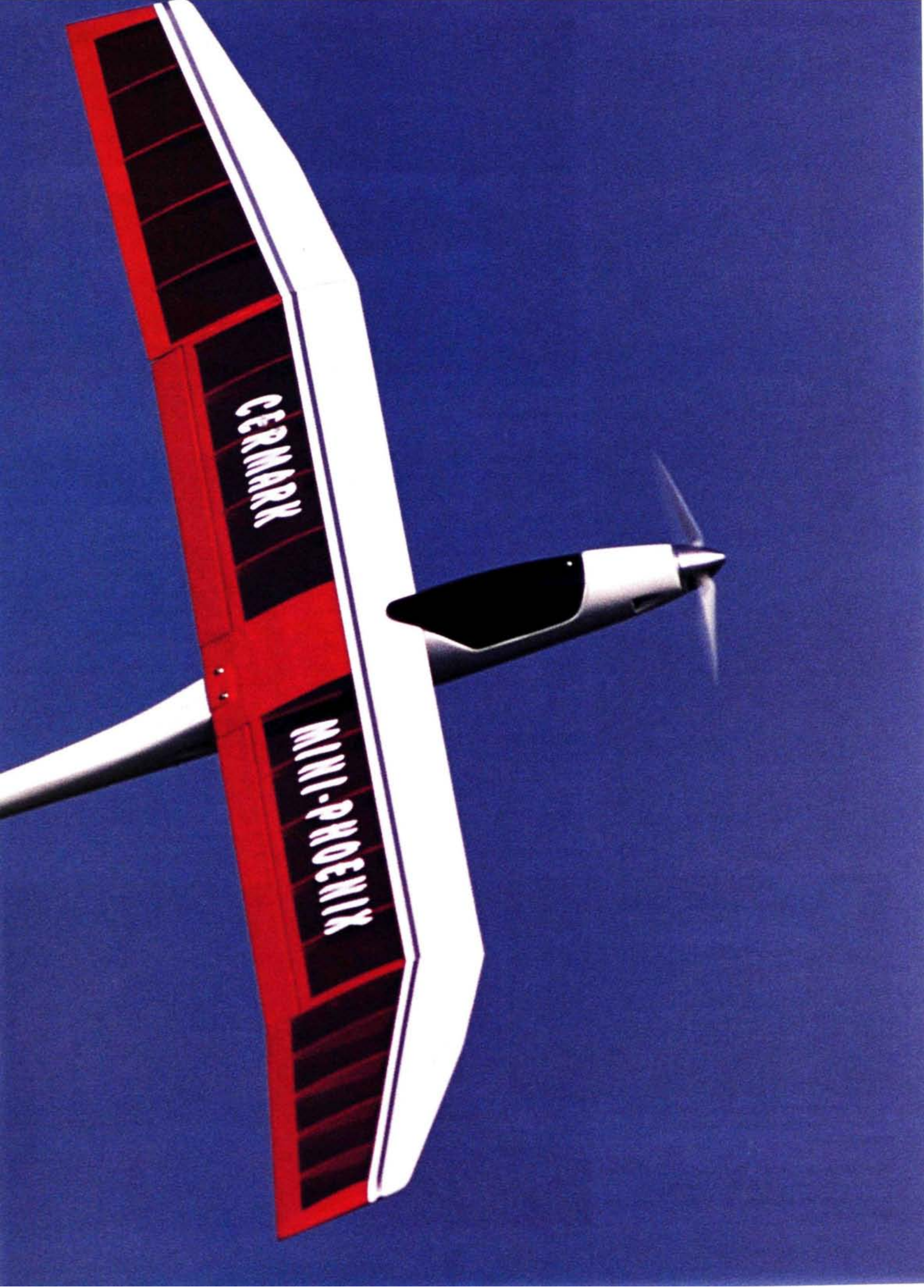


THE KIT

If a plane can be assembled in less than 1 hour, is it a "kit"? One look at the colorful box, and I knew I would have a ball with this sailplane. The Mini Phoenix comes completely built up and beautifully covered in high-quality Ultracote. Out of the box, it has only five major components: a center wing section, two wingtips, the fuselage and the stab with the elevator attached. The Mini Phoenix is available in three versions. The Basic Mini Phoenix comes almost ready to fly with the Speed 480 motor and prop already installed. The Silver Type includes two microservos in addition to the Basic model. And the Silver Plus Type (review model) features the Silver version plus a variable speed control. All three versions require a 3-channel radio system and a 6- or 7-cell battery.

ASSEMBLY

Because the model had been subjected to variations in temperature and humidity during shipping, I expected to find some wrinkles in the covering, but there weren't any. The ailerons come already installed, so I checked to make sure that they were secure. Per the instructions, I removed the spinner and checked the prop nut to make sure that it was tight. I then placed the center wing section on a flat surface and checked it for warps. I also made sure that the two screws that secure this section to the fuselage were aligned. (It's easier to do this before you add the wingtips.)


CERMARK
MINI-PHOENIX

SPECIFICATIONS

MODEL: Mini Phoenix AL

TYPE: mini sailplane ARF

MANUFACTURER: Cermark

WINGSPAN: 58 in.

WING AREA: 356 sq. in.

LENGTH: 36 in.

WEIGHT: 23 oz.

WING LOADING: 10.7 oz./sq. ft.

DRIVE SYSTEM INSTALLED: Speed 480 w/ a 7x3.5 folding prop

RADIO SYSTEM USED: Futaba 6XA with a Hitec Micro 555 receiver, 2 micro MC100 Hi Mark servos (included) and a Cermark SC-20 speed control (included)

BATTERY USED: Cermark KR-600-AE Ni-Cd

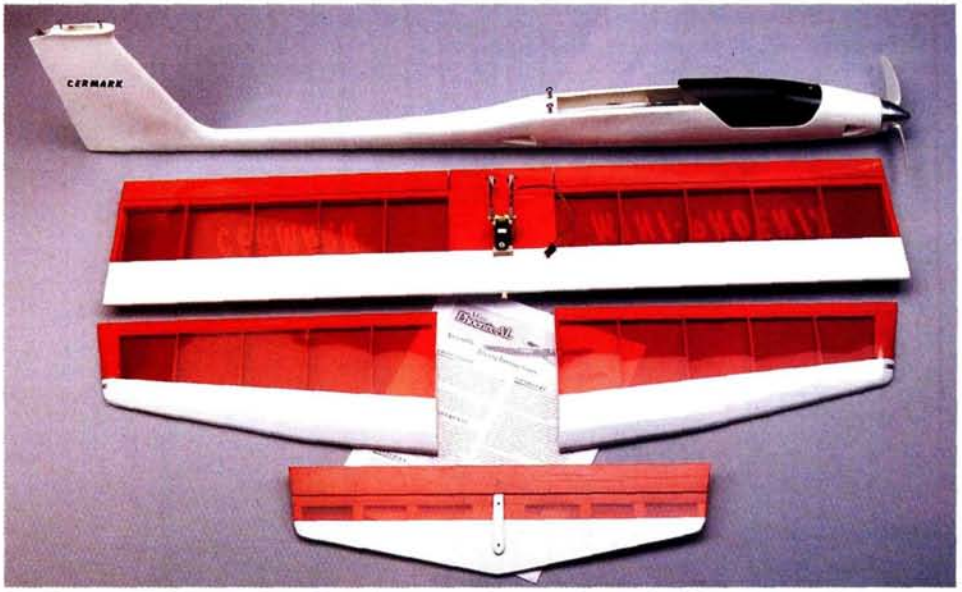
PRICES: $159.95 (Basic); $189.95 (Silver); $219.95 (Silver Plus)

FEATURES: Ultracote covering; built-up balsa wings and stab; fiberglass fuselage with molded-in cooling slots and fin; pushrods, hinges, servos and speed control installed.

COMMENTS: Cermark has added another winner to its stable of thoroughbreds. The see-through Ultracote reveals high-quality construction. Fully assembled, the sailplane is easily transportable, even in a compact car. The quiet electric power and compact size open a whole new world of flying sites for sailplane pilots.

HITS
- High-quality construction and covering.
- Ease of assembly.
- Compact size.

MISSES
- Hairline cracks in gelcoat near the fin.



The Cermark Mini Phoenix is available in three versions. I reviewed the Silver Plus model (shown here), in which the drive system and servos come already installed. As you can see, assembly is extremely minimal.

Wing. I used 5-minute epoxy to join the wingtips to the center section. The dihedral is preset by the ribs and two wooden dowels that come installed in the wingtips. Cermark indicates that the wing panels should be raised approximately 2⅜ inches at the tips. It's also important to make sure that both tips are equal and that the joint is a solid fit. The aileron servo comes already mounted and with the pushrods attached. I simply plugged the servo into the receiver and made sure that it was centered; that completed the wing.

Tail feathers. The elevator pushrod comes attached to the premounted servo and with the clevis extended out through the top of the fin. I attached the clevis to the elevator horn and then attached the stabilizer to the top of the fin with the two supplied machine screws.

Fuselage. The receiver can be mounted in the rear bay under the wings or in the cockpit area under the battery. For balancing purposes, I chose to mount it in the cockpit area. I wrapped a bit of foam around it and secured it into place with hook-and-loop fastener. I also used a 6-inch servo extension for the aileron servo. I then mounted the battery in the cockpit area and held it in place with hook-and-loop fastener.

An on/off switch comes already mounted in the fuselage; simply plug it into your radio. A dowel holds the canopy in place up front, and some hook-and-loop fastener secures it aft.

Next, I applied some thin CA to hairline cracks that I found in the rear of the fuselage. This worked perfectly; they have not gotten larger or caused any problems. I ran the radio antenna along the interior length of the fuselage, and it exits at the rear of the fin.

Above: the elevator comes already hinged to the stab, and attaching it to the fuselage is about as easy as it gets.

Right: the wing comes in three sections, and aligning the outer panels is almost automatic. The factory-installed alignment dowels and angled ribs ensure accuracy.

PHOTOS BY BOB VAN TASSEL

FLIGHT PERFORMANCE

At the field, I gave the radio a final range-check to make sure that there wasn't any interference. I also tested the motor once more before taking off.

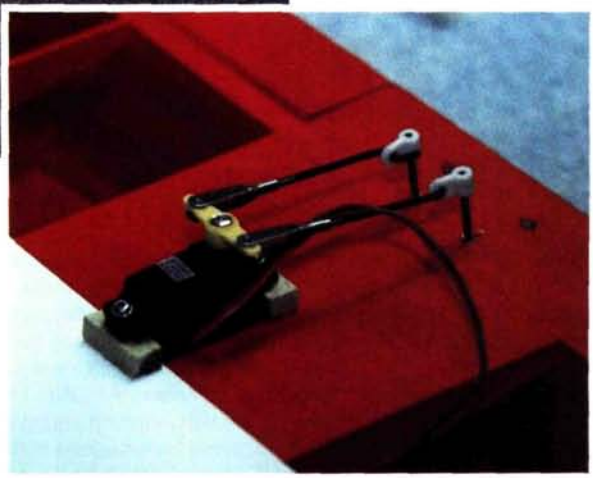
TAKEOFF AND LANDING. After you hand-launch the Mini Phoenix into the wind, the model flies out level for about 25 feet. With just a touch of up-elevator, it's on the rise. I keep my turns shallow and the climb gentle until the model gains enough altitude to explore the flight envelope. The addition of power produces a rapid climb at about 25 degrees.

After flying a normal pattern, I cut power on the downwind. On base, I descend to the altitude I want to be at on final. On final approach, I make any necessary minor corrections. Keeping in mind that there is no rudder and the ailerons are inboard, I try not to make many course corrections slow and low to the ground. The Mini Phoenix, as do all sailplanes, requires that you fly and think ahead of it. With this in mind, I let the sailplane decide where it wants to touch down.

LOW-SPEED FLIGHT. Small size and light wing loading combine to make slow flying a pleasure. Just remember to maintain enough speed for the inboard ailerons to remain effective. At about 300 feet high, I shut the motor down and check the glide. It's flat and has no tendency to porpoise. I then gradually feed in some up-elevator to check the stall characteristics. On the first test flight, the only stall I was able to achieve was a gentle porpoise with very little loss of altitude.

HIGH-SPEED FLIGHT. High speed is not the Mini Phoenix's forte, but it has plenty of power—especially while climbing out or looking for thermals. The transition from low speed to level flight requires no trim adjustments.

AEROBATICS. The Mini Phoenix was obviously not designed with aerobatics in mind. Though it is capable of loops, they require a power-on dive and the motor to be cut at the top of the climb.



Above: the fuselage has plenty of room to accommodate all the radio gear. I mounted the receiver in the rear of the cockpit for balancing purposes. Right: the aileron servo and linkages are already installed and hooked up to the ailerons. How's that for convenience!

Last, I adjusted the flight controls. The recommended control for the first flight is 5/16 inch up- and down-elevator and 3/8 inch up- and down-ailerons. The controls may later be adjusted to your piloting skills. Following the instructions, I set the CG at 1½ to 1¾ inch behind the leading edge of the wing center section. Then it was time to charge up my battery, gas up my car and head off to the field.

CONCLUSION

The new Mini Phoenix is a great introduction to the world of sailplanes. It can be assembled in no time at all and flown in areas that would restrict larger models. It also features top-quality construction and great performance. If sailplanes are something you've been wanting to check out, the Mini Phoenix is a great place to start.

Cermark (562) 906-0808; cermark.com.
Futaba; distributed by Great Planes Model Distributors Co. (800) 637-7660; futaba-rc.com.
Hitec RCD Inc. (858) 748-6948; hitecrcd.com.

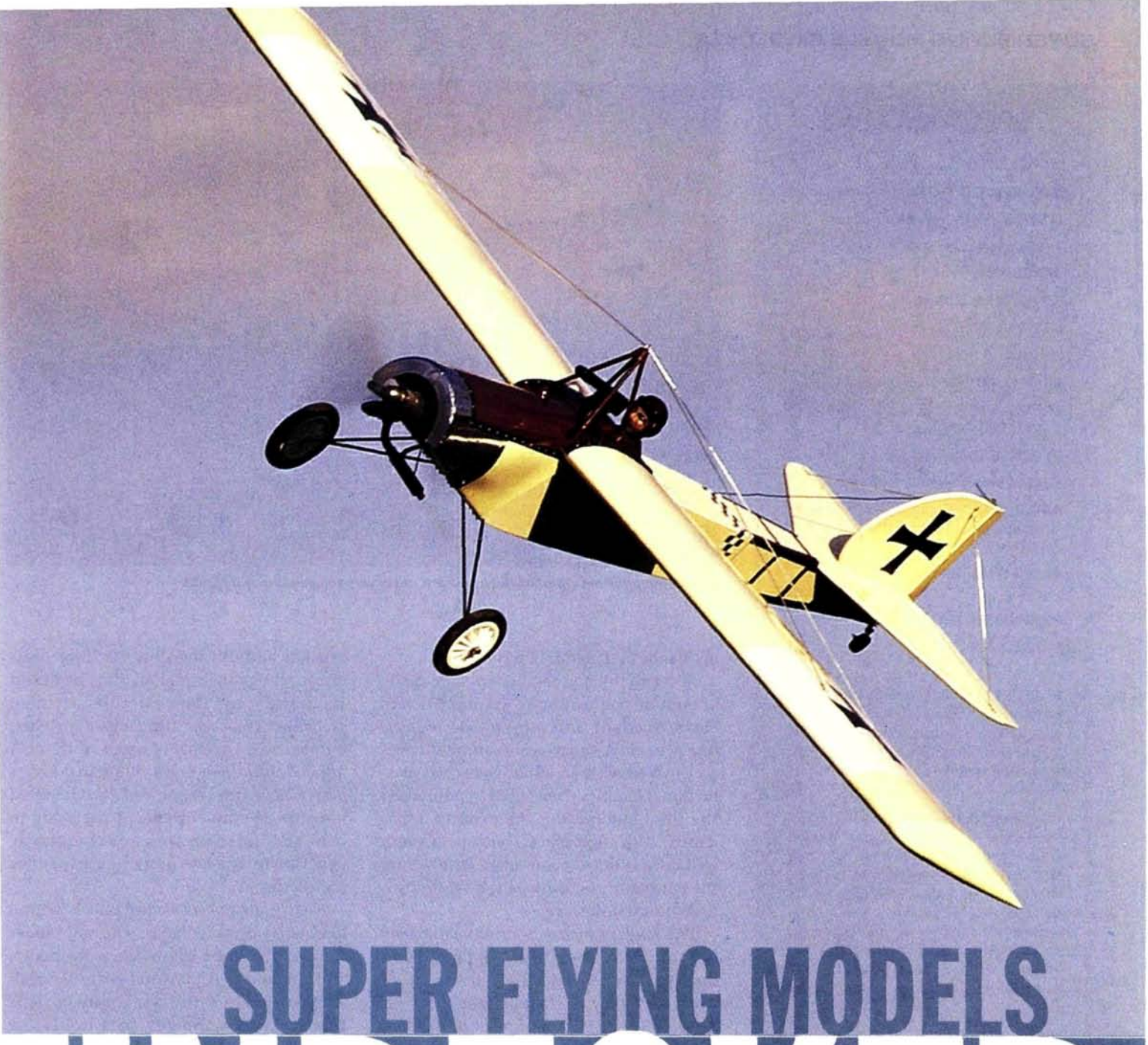
Classic, almost-ready-to-fly fighter

PHOTOS BY CHERI SASSMAN

by Peter Abbe

There is a certain nostalgia associated with early aircraft. Rickety airframes, rotary engines and flying wires seem to capture a sense of wonder and imagination. They remind us of a simpler time when aviation was new and exciting—a time when an aerial battle looked more like a "flying circus" than a dogfight.

The Super Flying Models Eindecker 46 delivers this sense of nostalgia and excitement to newcomers and seasoned pilots. Its quick assembly and scale-like details provide inexperienced builders with a great-looking semi-scale model. With its relatively light wing loading and flat-bottom airfoil, its flight characteristics are well suited to low-time pilots who are looking to move beyond a basic trainer.



SUPER FLYING MODELS

EINDECKER

SPECIFICATIONS

MODEL: Eindecker .46

MANUFACTURER: Super Flying Models

DISTRIBUTOR: Horizon Hobby

TYPE: sport-scale ARF

WINGSPAN: 63 in.

WING AREA: 756 sq. in.

LENGTH: 49 in.

WEIGHT: 6 lb., 8 oz..

WING LOADING: 19.8 oz./sq. ft.

ENGINE REQ'D: .35 to .45 2-stroke or .40 to .60 4-stroke

ENGINE USED: Saito .56

FUEL: Powermaster 15% nitro

RADIO REQ'D: 4-channel w/5 servos (rudder, elevator, throttle and ailerons)

RADIO USED: JR Quattro w/JR 507 servos

PROP USED: APC 12x6

PRICE: $109.99

FEATURES: built-up balsa and plywood construction; complete hardware package; painted fiberglass cowl; scale-like details, including pilot figure, flying wires and wheels.

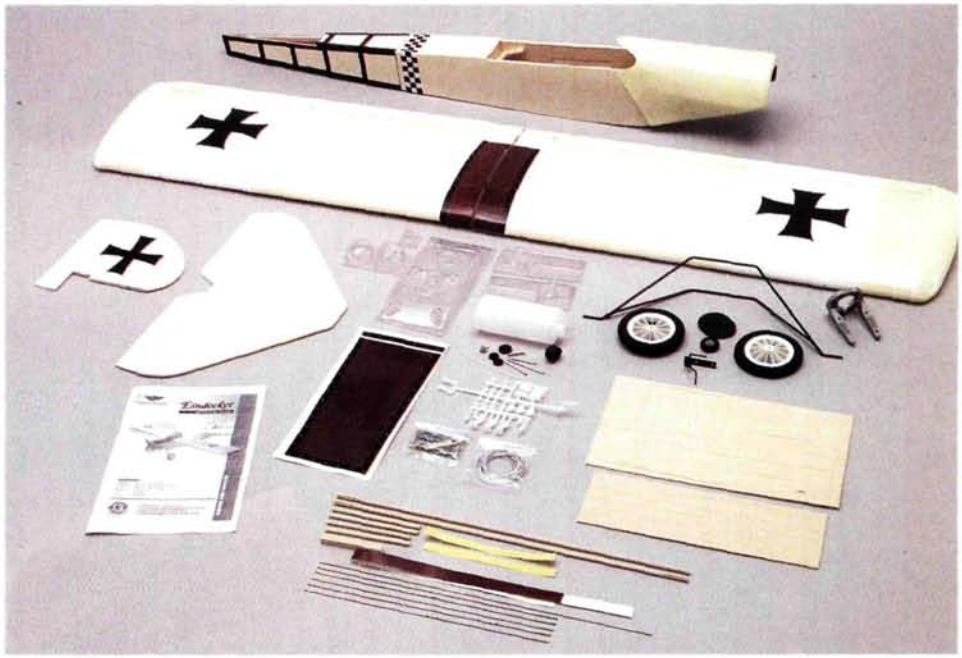
COMMENTS: the Eindecker .46 is a sport-scale ARF that can be assembled quickly and looks great. Its simple construction and easy-to-follow instruction manual make it ideally suited to novice builders. Any beginner who has mastered a basic trainer will appreciate its stable flight characteristics and its ability to perform basic aerobatic maneuvers.

HITS

- Ease of construction.
- Complete hardware package.
- Great appearance.
- Gentle flight characteristics.

MISSES

- Control-surface throws not specified in manual.



The kit includes nearly all of the hardware necessary to complete the model.

KIT CONTENTS

The Eindecker's parts are well organized and come packaged in separate bags. While inspecting the contents, I realized that this was the most complete kit I had ever seen: virtually all of the hardware, including the fuel tank, universal engine mount, wheels, screws and pushrods, a transparent-plastic "machine gun," wing center section and pilot figure were all included. The fiberglass cowl was nicely painted but slightly cracked. One quick call to Horizon, and I had a new cowl in my hands in a matter of days.

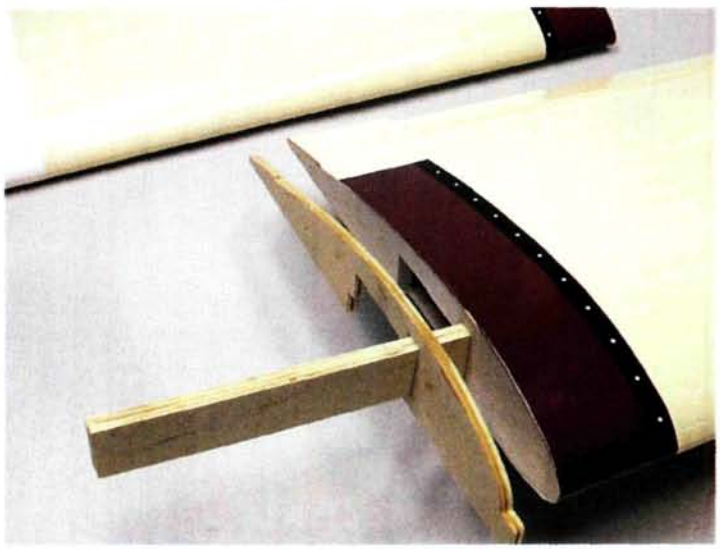
All of the major components are made of built-up balsa and ply. Assembly is very clean, straight and strong. The wings, fuselage, empennage and control surfaces are covered with an adhesive-backed plastic film. Graphics come already printed on the film, eliminating the need to apply decals. Although the covering was very well done, I noted some small wrinkles on the bottom of the wing panels—nothing a little heat didn't solve.

The 20-page instruction manual is very easy to follow. More than 90 photos and drawings remove nearly all of the guesswork. Assembly is so basic that the average builder can complete most of the construction simply by following the photographs. Check off each step as you complete it.

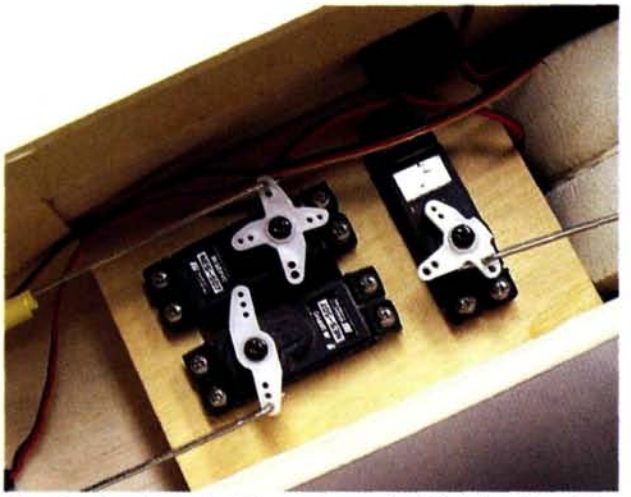
ASSEMBLY

Wing. The first order of business is to attach the ailerons. The pinned hinges are supplied and come already installed in position. They must simply be removed and glued into place. I chose Gorilla Glue to install all of the hinges because it expands and fills the slots. All hinge slots in the wing panels and ailerons had been accurately cut. The ailerons are also predrilled to accept the factory-installed torque rods. A couple of drops of thin CA dripped into these holes eliminated excess play where the torque rods are inserted into the ailerons. I found it necessary to trim the inner portions of the plastic wingtips to achieve proper clearance for the ailerons.

Next, join the two wing panels with a laminated plywood spar. The spar slides into a tube built into each wing panel, and a laminated plywood plate is sandwiched between the wing panels. This plate provides the key that holds the



A laminated spar joins the wings, and a plywood plate sandwiched between the wing panels functions as the leading-edge hold-down key.



Throttle, elevator and rudder servos are installed in a die-cut plywood plate. This plate is then dropped into precut notches in the fuselage and glued in place.

leading edge of the wing to the fuselage. The servo mount is constructed of two pieces of ply and keys into this plate as well.

Fuselage. The fuselage requires very little preparation. Blind nuts are in place to accept the engine mount and the hold-down bolts for the wing. The universal cast-aluminum engine mount easily accommodated my Saito .56. The firewall is fuelproof, and the fuel tank fits perfectly into position. Mounting the servos was also a snap. Simply drop them in a plywood tray, drill holes in the tray, and screw the servos in place. Once this is complete, the tray drops in place inside the fuselage. As shown in the manual, the pushrod wires are bent and are then inserted into predrilled and slotted dowels. A length of heat-shrink tubing holds the wires in the dowels. Routing the pushrods through the fuselage required some time and patience. I found it necessary to tie the threaded ends of the elevator pushrod together to get it past the aft fuselage former. Once it was past this former, I removed the tie through the exit holes and carefully worked the rods into position.

Tail feathers. The stabilizer and fin are both built-up structures. The base of the fin slides into a slot in the stabilizer. This must be carefully aligned with a square. Glue the tail assembly to the fuselage before you attach the control surfaces. It's a good idea to take your time here and make sure that everything is straight and true.

Next, glue the hinges in place and attach the control horns to the control surfaces. A hole must be drilled in the rudder to accept the tailwheel-wire guide. Strengthen this hole with a few drops of CA before you glue the rudder into position.

Scale details and final assembly. You must trim the cowl to provide clearance for the engine and the forward portion of the landing-gear legs. It's important to work carefully here; the paint has a tendency to chip off where it is being trimmed. I covered the front of my cowl with silver MonoKote trim material. It was somewhat difficult to work around the compound curves, but with some patience and careful cutting, I was

FLIGHT PERFORMANCE

Test flights were conducted on a blustery, cold evening. I fired up my Saito .56 and taxied around; ground handling was very positive even with wind gusts of up to 10mph. I set the control throws at +/- 5/8 inch for ailerons and elevator and at +/- 7/8 inch for the rudder.

TAKEOFF AND LANDING

As I advance the throttle, the Eindecker tracks very straight and requires a minimum of rudder correction. Once it achieves flying speed, the plane simply rises off the ground and climbs out almost hands-off.

When landing for the first time, I chopped the throttle when the model was lined up with the runway; the Eindecker dropped much more quickly than I had expected it to, and I lost much of my elevator authority—lesson learned.

Subsequent landings have been made with some power on. This allows a much more controlled descent rate. With some practice, I now consistently perform gentle touchdowns in a 3-point attitude.

SLOW-SPEED PERFORMANCE

The Eindecker slows down nicely. Even at a lower power setting, the plane maintains a nice, groovy feel. A touch of coordinated rudder really smoothes out the turns. The plane requires a fairly nose-high attitude to induce a slow-speed stall. Stalls are straight ahead and somewhat sharper than those of a trainer—nothing to be afraid of; simply release the elevator, throttle up and continue flying.

HIGH-SPEED FLIGHT

This model was not designed for high speeds, so full throttle does not greatly increase airspeed. The radial cowl and flying wires create significant drag and limit the top speed.

The plane tracks very well and handles wind gusts better than I had expected. Handling is smooth and solid throughout all the higher power settings.

AEROBATICS

Rolls are comfortable but require a touch of down-elevator when the plane is inverted. Adding a little rudder increases this model's roll rate considerably. Loops are large and smooth, and both left and right stall turns are effortless. Sustained inverted flight requires only a bit of down-elevator. The Eindecker is also capable of ½ Cuban-8s and Immelmann turns, though these maneuvers would benefit from a more powerful engine.

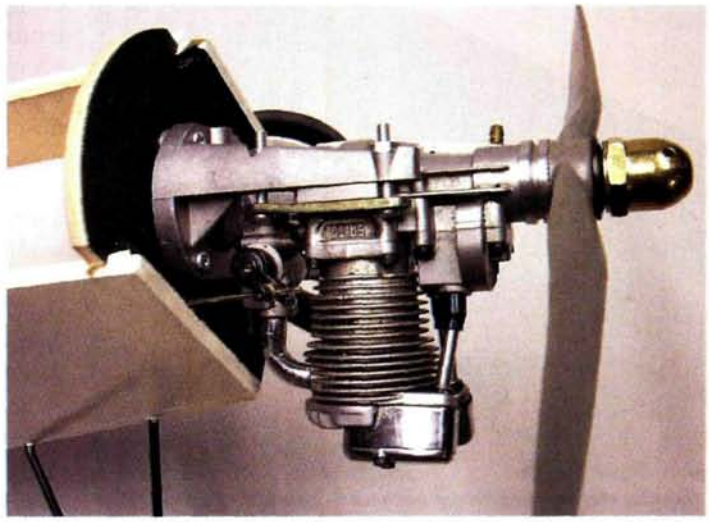
Although very capable, this plane was designed with beginners and intermediate pilots in mind. The large flat-bottom wing limits aerobatics to basic maneuvers. Set up according to the instructions, it is difficult to snap or spin the Eindecker, but those who are moving up from a trainer will appreciate this stability.

able to achieve a finished look.

The instruction manual leaves the finishing of the pilot, wing center section and machine gun up to the builder's imagination. These parts are made of transparent plastic, and they should be trimmed and painted before you attach them to the wing. I applied some inexpensive brown and black enamel to the insides of these parts. After I had cut out and assembled the pilot, I painted the face using Testors acrylic paint. This paint works well because it can be mixed to achieve the desired colors.

Once you've secured the pilot, wing center section and "machine gun"to the wing, it's time to attach the flying wires. The flying wires are made out of a silver elastic cord that you must cut into several specific lengths. Electrical connectors are then crimped to the ends of the cord for attachment to the wing. The wires on the wings should be screwed into hardwood blocks under the covering; the tail wires are simply screwed into the balsa. Although these wires are not functional and could be omitted, the final result is well worth the little bit of extra effort they require.

With the detail work out of the way, the only things left to do are to set up the radio, check the wing alignment and balance the model. I balanced it using a 2-ounce heavy prop hub on the nose of the Saito .56. The wing alignment was nearly perfect but did require that I glue an ⅛-inch plywood shim to the top of the leading-edge hold-down key to keep the leading edge tight to the wing mount.



The universal engine mount easily accommodates the Saito .56, which I mounted as far forward as possible. With a 2-ounce hub, no additional weight was necessary to balance the model.

The wing leading edge keys into a plywood former. For a snug fit, I glued an ⅛-inch-plywood shim to the top of the key. Note the scale-like pilot. It was easy to install and makes the Eindecker look realistic.

CONCLUSION

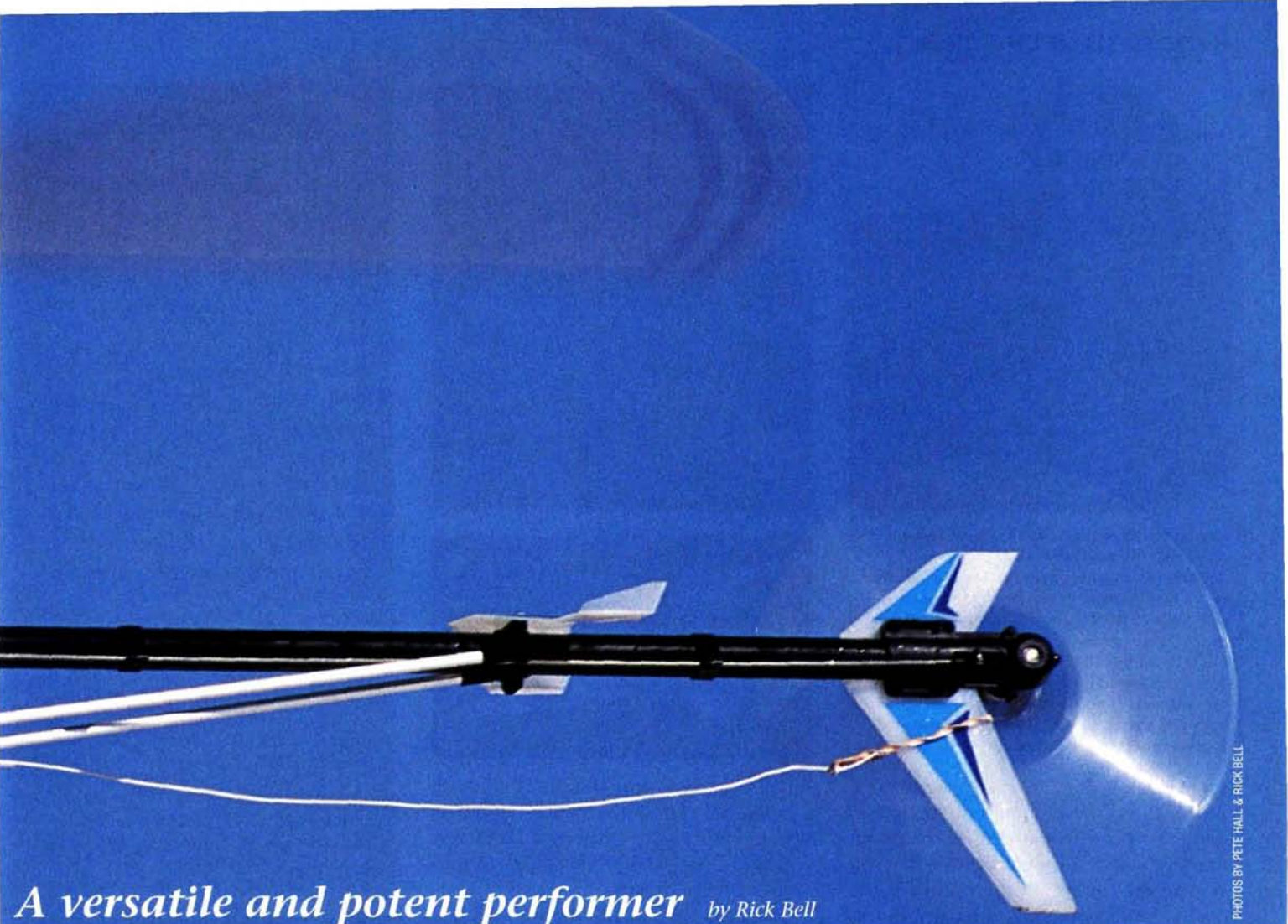
The Eindecker .46 is an excellent value for any builder who is looking to re-create an aircraft with antique charm. It is easy to build, complete, and it looks fantastic. Its flight characteristics make it an excellent choice for beginners who are looking to move up from a basic trainer to a mildly aerobatic tail-dragger. Whether in the air or on the ground, my Eindecker continues to draw compliments wherever we go.

APC Props; distributed by Landing Products (530) 661-0399; apcprop.com.
JR; distributed by Horizon Hobby Inc.
Super Flying Models; distributed by Horizon Hobby Inc.
Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.
MonoKote; distributed by Great Planes (800) 637-7660; greatplanes.com.
Powermaster Hobby Products Inc. (512) 285-9595; powermasterfuels.com.
Saito; distributed by Horizon Hobby Inc.
Testors Corp. (815) 962-6654; (800) TESTORS; testors.com.

Kyosho CALIBER 30 ARF

It's no secret that I love helicopters. I love to fly them, build them and work on them. My first heli was a Kyosho Concept 30 DX, with which I learned to hover, fly forward flight and do basic aerobatics. I definitely have a soft spot for it, and many Concept 30s are still flying today.

Now, 12 years after I flew my Concept 30, I was asked to check out Kyosho's newest .30 heli—the Caliber 30. I agreed without too much arm-twisting! This heli is aimed directly at advanced pilots, but Kyosho's engineers had a few other things in mind when they designed it. Let's take a look.



PHOTOS BY PETE HALL & RICK BELL

A versatile and potent performer

by Rick Bell

OVERVIEW

The Caliber 30 is loosely based on Kyosho's proven FAI competitor and big brother, the Caliber 60. What makes the Caliber 30 unique are its main rotor head and the servo-control system. The rotor head gives modelers the option to match control response to their skill level. This means that a beginner can learn on a very stable heli, and as he progresses to forward flight and aerobatics, he can simply change the positions of the links that control the rotor head to obtain more control authority.

The control system is also unique. You can set it up for a standard mechanical mix by which each servo controls one cyclic function or for the more popular cyclic/collective pitch mixing (CCPM) that Kyosho describes as its "electronic mixing system" (EMS). This versatility means that if your transmitter doesn't support CCPM, you don't have to buy a new radio system to fly this heli.

The Caliber's drive system is a two-stage, belt-driven, gear-reduction unit that produces a very smooth and quiet gear train. It also features a constant-drive tail rotor for complete tail control during autorotations. These features are not usually found on .30-size helis.

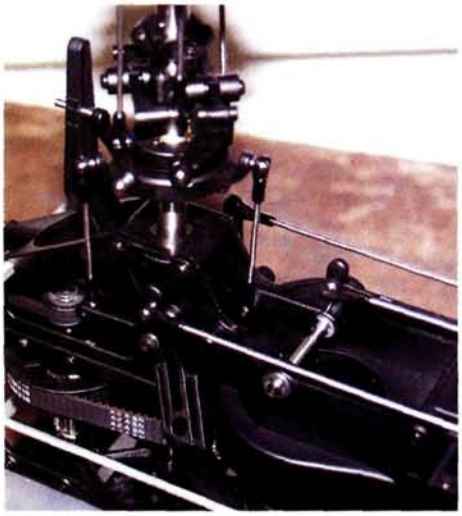
Assembling the Caliber is straightforward and quick, thanks to its modular design. The main frame is molded in halves of a tough plastic reinforced with fiberglass strands. The cooling shroud is an integral part of the main frame. Except for the rear-mounted tail-rotor servo, the servos are in a module that is mounted on the front of the main frame. This module also houses the receiver, the gyro and the flight pack.

ASSEMBLY

The Caliber is available in two versions: both are almost ready to fly, but one comes with an installed O.S. .32 SX-H engine; with either version, assembly is quick. The chassis, main rotor head and tail rotor are already assembled, so all you have to do is install the radio system and the engine and make up the pushrods. The manual guides you through the assembly process with detailed drawings and very few words. Study each step before you start it, and you'll have no problems.

Assembly starts with engine installation, but if your kit includes one, skip this part (my kit didn't have an engine). The engine mount is a hefty aluminum, two-piece, L-shape unit that uses three spacers to connect them. I aligned the mount on a thick piece of glass before I bolted the halves together. This ensures that the pieces aren't skewed or twisted. Next, I installed the clutch, the cooling fan and the starter coupling to the engine. (The coupling is only fixed temporarily; it, the hex adapter and the cooling fan must be removed before you install the engine in the frame. They're installed now so the parts can be properly aligned and tightened.) I then pushed the fan into place in the frame and followed it with the clutch bell and the engine with the mount. When I had everything properly aligned, I tightened the engine on the mount and the mount to the frame. The engine mount is a stressed member of the chassis and really stiffens it. Now add the kit-supplied muffler to the engine.

The tail boom and tail rotor come assembled; you need only add the tail-rotor blades to complete the assembly. Before you install the boom to the chassis, make



Above: the swashplate has multiple pick-up points for the pushrods. Their placement depends on which control system is used. This is the ESM system. Above right: the secret to the Caliber's success is the main rotor. It can easily be set up for beginners or experienced pilots by simply flipping the blade grips over and repositioning the pushrods to them. Right: the tail-rotor control system is well thought out and very accurate. The "dual-control support system" contributes to this.

sure that the drive belt is twisted in the proper direction: it should be twisted 90 degrees clockwise (looking at the boom from the front). If it isn't, the tail rotor will spin in the wrong direction. I added the boom to the chassis, tensioned the belt and added the boom supports. I trimmed the canopy and added the decals to complete the heli's assembly. It's now time to install the radio system and linkages.

RADIO INSTALLATION AND SETUP

Before installing the servos, you must decide which control system you will use—electronic (EMS) or mechanical mixing (MMS)—as each system has a different servo layout and pushrod setup. Also, in the EMS system, the servo tray is locked into place, while the MMS system's servo tray slides fore and aft to provide collective inputs.

From the onset of this review, I decided to build the heli in both MMS and EMS configurations to compare their flight characteristics and to see whether a beginner would indeed be able to reconfigure the control system as his flight skills increased.

• **EMS setup.** It is more commonly known as cyclic/collective-pitch mixing (CCPM). This very simple system uses electronic mixing through the transmitter; to use this system, your transmitter must have 120-degree CCPM mixing to properly synchronize the servos' movement.

I installed the servo tray and secured it to the chassis with the supplied hardware. Next, install the servos in the tray, but be careful of their orientation; their output shafts must be to the rear of the tray. Install two bellcranks on each side of the chassis; there are two mounting points for them (your choice will depend on which control system you use). The EMS system uses the rear mounting point. Most of the pushrods are the correct lengths; this saves a lot of time. I now fitted the servo arms, pushrods, receiver, switch harness, gyro and battery.

The Caliber is available in two ARF versions, one of which has an O.S. .32 SX-H engine installed. In the other version, the engine choice is up to the builder. Either way, assembly is quick and easy.

SPECIFICATIONS

MODEL: Caliber 30 ARF

TYPE: collective-pitch helicopter

MANUFACTURER: Kyosho

DISTRIBUTOR: Great Planes

WEIGHT: 6.3 lb.

MAIN ROTOR DIAMETER: 48.4 in.

LENGTH: 43 in.

RADIO REQ'D: 5-channel heli

RADIO USED: Futaba 9C w/5 Futaba servos

ENGINE REQ'D: .32 to .39 2-stroke heli engine

ENGINE USED: Webra .35 heli

FUEL USED: Wildcat 30% nitro heli fuel

GYRO USED: Futaba GY240

STREET PRICE: $329.99 w/out engine; $449.99 w/O.S. .32 SX-H

FEATURES: ARF format; belt-driven tail; boom-mounted tail-rotor servo; modular assembly; electronic- or mechanical-mixing control system; includes muffler and colorful decals; available with O.S. .32 SX-H engine.

COMMENTS: the Kyosho Caliber 30 comes largely assembled; you can be up and flying a few hours after you open the box. The versatile control system is easy to set up and allows maximum radio compatibility, and the reversible main-rotor grips can be set for high stability (this makes it perfect for beginners). Change the grips around, and you'll have a maneuverable heli that you can really wring out.

HITS

- Fast assembly.
- Electronic or mechanical mixing.
- Operates very quietly.
- Fun to fly.

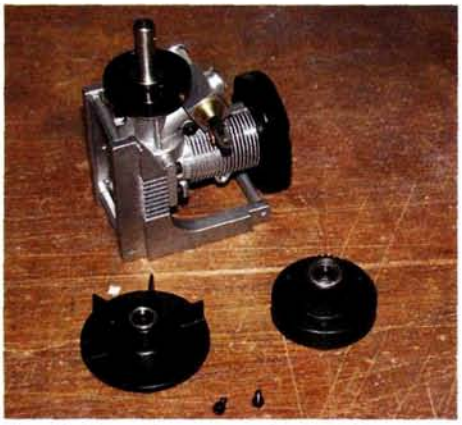
MISSES

- None.

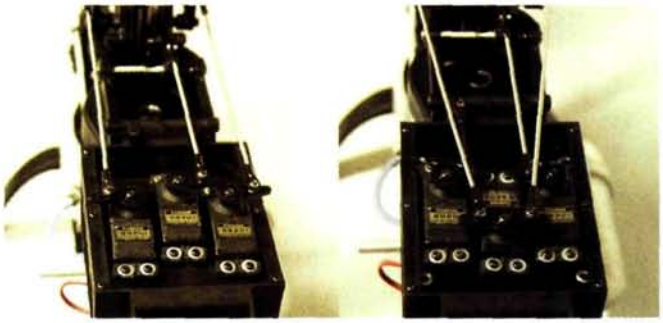
I adjusted the radio according to the values given in the manual for the 120-degree CCPM—a good starting point.

I checked the gyro to make sure that it was sensing in the proper direction, adjusted the throttle pushrod and set up the pitch and throttle curves.

• **MMS setup.** Changing the heli over to mechanical mixing is quick and easy. First, disconnect and remove the pushrods, unplug the servos from the receiver, and remove the servo tray from the chassis. Remove the center servo, and reinstall it so its output shaft faces the front of the tray. The servo arms also need to be repositioned. To allow the tray to slide back and forth, install a ball bearing on each corner of it; two bars hold the tray on the chassis. Move the bellcranks on the frame to the forward mounts, and adjust and install the pushrods. I made a new program in my radio and again set up the pitch and throttle curves as recommended. I checked all systems as I did before to ensure that everything was working properly. The mixing change took about 1 hour to complete.



Here is the engine mount with the Webra .35 installed. When this assembly is mated to the chassis, it adds a lot of stiffness.



Left: here's the ESM servo and pushrod layout; it's very simple to set up. To get the best performance from the heli, the three servos must be the same so there isn't any control interaction. Right: as you can see, the MMS system's servo layout is slightly different. The servo tray is supported by a bearing on each corner, and this allows the tray to slide fore and aft. This sliding motion controls the collective pitch.

SUMMARY

The Kyosho Caliber 30's overall versatility is outstanding and represents good value in a .30-size helicopter. Being able to change the control system to suit your radio system is a unique capability, and if I'm not mistaken, this is the only heli with this feature. The premade linkages make radio installation and control-system setup a snap—virtually foolproof. The model performs very well in many roles; it's good for beginners and experts who are looking for a capable aerobatic heli. I really enjoyed building (what little there was) and flying this helicopter, and I recommend it for all heli enthusiasts. ✈

Futaba Corp. of America; *distributed by Great Planes; futaba-rc.com.*

Great Planes Model Distributors Co. *(800) 637-7660; greatplanes.com.*

Kyosho; *distributed by Great Planes; kyosho.com.*

Webra; *distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.*

Wildcat Fuels Inc. *(888) 815-757; wildcatfuel.com.*

FLIGHT PERFORMANCE

I flight-tested the Caliber 30 in two stages: with the heli set up as recommended for beginners and with the aerobatic setup for more aggressive maneuvers. Within each regime, I also compared the EMS and the MMS control systems to check for differences in flight characteristics.

BEGINNER SETUP

In EMS mode, the Caliber is excellent! After the initial engine and trim tweaks that all helis require, the Caliber sat in a stable hover. The first thing that became obvious was how quiet the heli was. The kit-supplied muffler does a remarkable job of keeping engine noise to a minimum. Combine this with the belt-driven transmission that absorbs engine pulses, and you have a package that just purrs along quietly.

The response to cyclic inputs was firm yet forgiving of the heavy inputs that most beginners inadvertently make—just the ticket for building confidence in a budding heli pilot! Pushing the Caliber into forward flight, I flew circuits around the field and found the Caliber very predictable; it felt like a larger, heavier helicopter.

After using several tanks of fuel with the EMS control system, I switched the heli to the MMS system. Both systems were very good: each provided good, solid, predictable control, but the EMS system had a slight edge. Its three servos work as a more powerful team than the MMS's one-on-one, servo-to-cyclic function; the EMS felt a little stronger and more accurate. As I move into aerobatics, I'm sure this will become more obvious.

Overall, the Caliber 30 is very good for novices, it's smooth, quiet and stable.

AEROBATIC SETUP

When the engine had some time on it and with the MMS system still set up, I flipped the blade grips from the stable trainer mode to the more maneuverable mode and adjusted the pitch links. I also reprogrammed the radio for aerobatics.

Back at the field, I put the Caliber into a hover, and I immediately felt that it had more cyclic authority; entering forward flight showed that this was the case. I engaged the idle-up, and the head speed increased to about 1,700rpm. This was more like it; the Caliber was coming to life! As it moved along at a good speed, I tried a few maneuvers. I pulled back on the elevator for a stall turn, and the Caliber showed good vertical climb. Loops were next, and the Caliber went up and over the top easily. I also tried rolls, and they were very axial. Taking the Caliber up to a safe altitude, I engaged the throttle hold and performed an autorotation. The supplied wooden blades worked surprisingly well. After a few more flights, I switched the controls over to the EMS system.

To make a fair comparison of the control systems, I flew the same maneuvers as before. As I expected, the EMS control system was more powerful and precise, and the maneuvers were a little easier to do. I also did several mild 3D maneuvers such as stationary flips and rolls, and the control response was predictable and solid. Either way, the Caliber is a solid performer.

Easy CA Hinges

Control-surface installation in eight simple steps

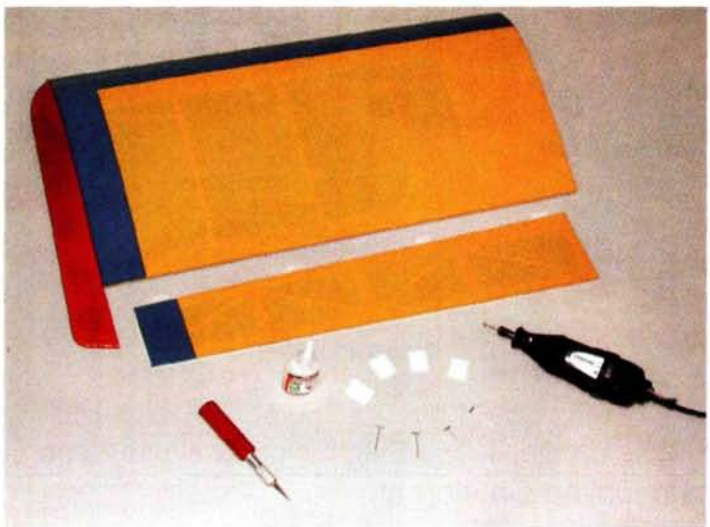
by Erick Royer

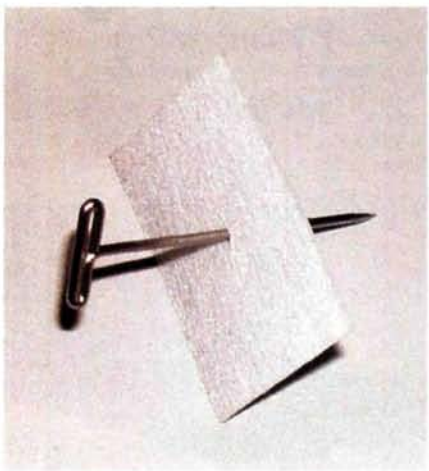
Almost-ready-to-fly (ARF) models are more popular than ever. They are available for just about any type of aircraft you can think of. Whether you build an Extra 300 or a P-51 Mustang, many of the assembly steps are the same, and that includes control-surface hinging.

Several types of hinges are available, but CA hinges are by far the most popular. A CA hinge is a thin piece of Mylar covered with cloth (wick) that is most often held in place by thin cyanoacrylate (CA). CA hinges are inexpensive, easy to install and do not require any special tools or modeling skills.

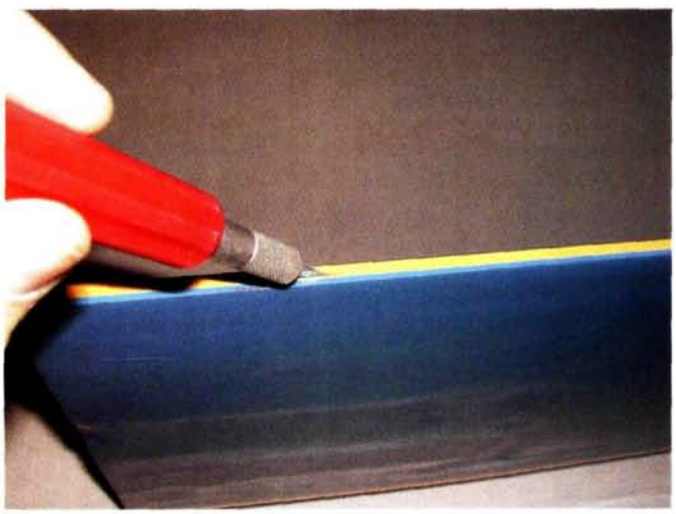
To illustrate how easy it is to install CA hinges, I'll describe how I hinged the ailerons on my Model Tech Magic ARF. Let's get started.

1 **Here are all the items you'll need to successfully install CA hinges. In many cases, these hinges are included with the model. I use four hinges for each control surface. In addition to the wing, the control surfaces and CA hinges, you'll need T-pins, thin CA (I use Great Planes thin CA), a high-speed rotary tool with a 3/32-inch drill bit and a hobby knife with a sharp no. 11 blade.**



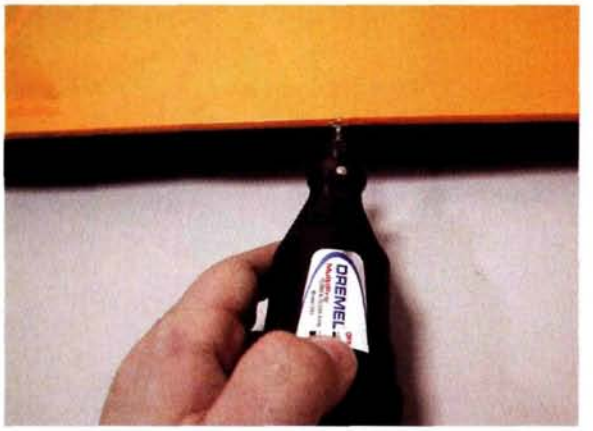


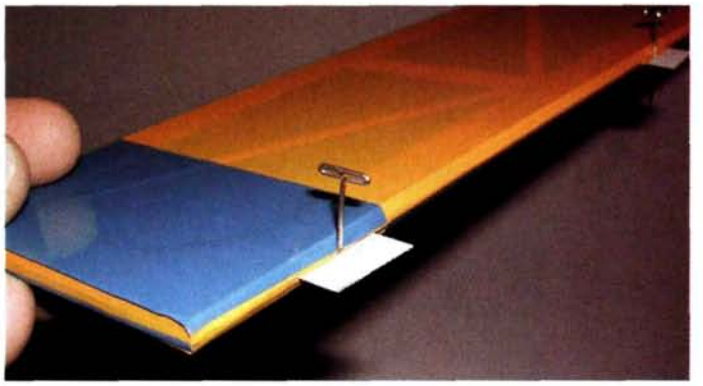
2 **The first step is to push a T-pin through the center of each CA hinge. This ensures that the hinge fits equally into the control surface and the wing. It also serves as a spacer.**



3 **Determine the positions for the CA hinges on the wing and the control surface. As is the case with many ARFs, the Magic comes with the hinge slots already cut. Use the hobby knife to remove any excess balsa or covering that might prevent the hinge from fitting properly.**

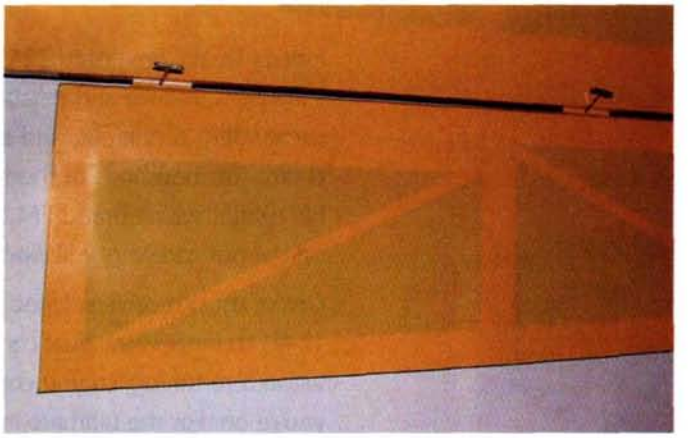
4 This step is optional, but it does help to ensure that the entire hinge will absorb the CA. Use a high-speed rotary tool (I used a Dremel) with a 3/32-inch bit to drill a hole in the center of the hinge slot on the wing and the control surface. The hole should be no deeper than the depth of the hinge. You could use a power drill instead of a rotary tool, but the rotary tool's high rpms will make a cleaner hole with less risk of damage to the balsa.



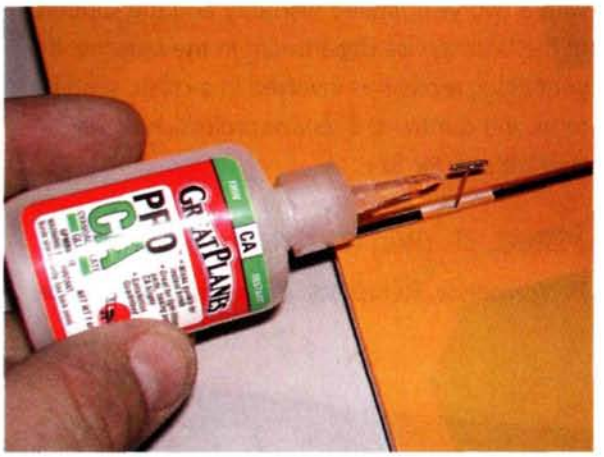


5 Slide CA hinges into the slots on the control surface until the T-pins rest against its leading edge.

6 To attach the control surface to the wing, carefully insert the hinges into the corresponding slots on the wing until the T-pins touch the wing's trailing edge. Go slowly, and make sure that everything fits properly.



7 Put thin CA on the hinges to permanently secure them. I like to leave the T-pins in the hinges until after I've applied the glue. This creates a small gap between the control surface and the wing's trailing edge to allow for maximum control throw; this is essential for a highly aerobatic model. On some models, removing the pin and pushing the control surface tightly against the wing will restrict the control-surface throw and could put too much stress on the hinge. On the other hand, a large gap will allow air to pass between the control surface and the wing instead of over it; this might cause flutter in flight. On larger models, I seal the hinge gap with transparent covering material to avoid having flutter problems.



Apply 4 or 5 drops of thin CA to each hinge, then flip the model over and apply 4 or 5 more drops to the other side. You may need to bend the control surface a bit to gain access to the entire hinge.

8 After a few minutes, remove the T-pins and flex the control surface up and down to its maximum deflection. This will help keep the Mylar flexible while the CA fully cures. Notice how much surface deflection the small gap that I left in the hinge line allows.

HINGE HINTS

Keep these hints in mind when installing your CA hinges, to ensure years of reliable service.

- Be sure to use only thin CA. It's the only adhesive that will penetrate deeply enough into the hinge slot. Clean out the slot with a hobby knife and drill a hole in the center to allow the CA to flow to the back of the hinge.
- Always be sure to use enough CA to bond the hinge securely to the wood; 4 or 5 drops per side is usually adequate. If you use too little, the hinge could fail in flight.
- Though it is not common, hinges sometimes break. This usually happens when a control surface has been pushed too hard against the trailing edge to avoid having a gap. Not only does that inhibit the surface movement, but it also puts undue stress on the hinge. It's always best to leave a small gap and seal it with clear tape or transparent covering.

That's all there is to it. If you take the time to install your CA hinges properly, they'll perform well for many years to come! ✈

Model Tech; *distributed exclusively by Global Hobby Distributers (714) 963-0329; globalhobby.com.*

Great Planes Model Mfg. *(800) 637-7660; greatplanes.com.*

electric Curtiss P-40

by Mark Rittinger

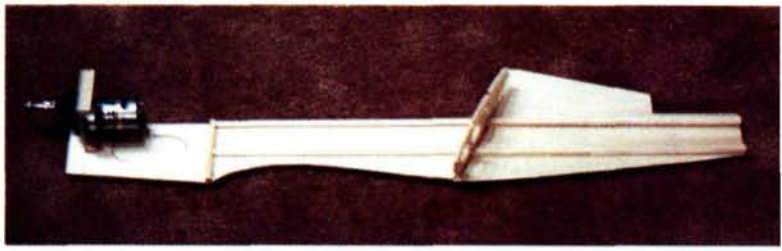
Author/designer Mark Rittinger poses with his impressive, electric- powered P-40E Warhawk.

An inexpensive, easy-to-build Warhawk!

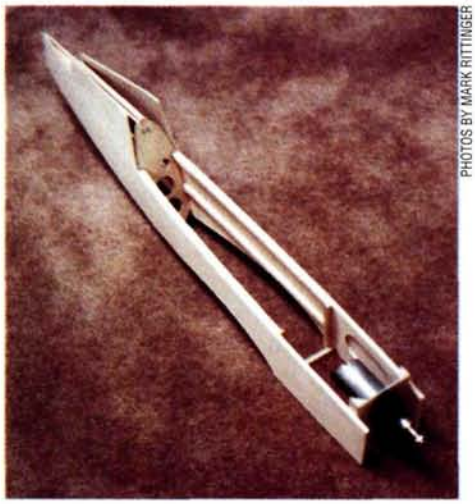
I think everyone knows the Curtiss P-40 "Hawk" series! Even those who aren't associated with aviation know the fearsome "sharks mouth" airplane that made Claire Chenault and the Flying Tigers famous. In the early 1940s, the P-40 became one of the most widely used fighters of WW II. Whether it was referred to as Tomahawk, Warhawk, or Kittyhawk, the P-40 fought all the way to the finish and did a fine job.

I like the odd types that you don't always see on the flightline, so I picked the E model. Though somewhat of a minor version, it is nevertheless one of my favorites.

If you always wanted a P-40, this just might be the one for you! It has a 42-inch span, 366 square inches of wing area and a final flying weight of 45 ounces. It is of all balsa and ply construction and has a balsa-sheeted pink-foam wing-core. I designed the model with a minimal parts count, and I kept the construction methods simple. It goes together fast; my prototype was framed up in less than two weeks. No landing gear means less drag and weight, so I left them off in favor of the hand-launch, finger-grip wells under the wing.



The basic fuselage side is easy to assemble. Note that the motor, gearbox and firewall are already glued into place.



PHOTOS BY MARK RITTINGER

Join the fuselage sides with the firewall/motor mount and former F2 in place and make sure that the tail ends align properly with each other.

The model is also very inexpensive to build. You do not need an expensive brushless—or even a Cobalt—motor to power it. The cells needed are readily available, and all you need is a common Magnetic Mayhem Reverse motor, a gearbox and a 30A ESC. To save weight and make it stronger, I built the P-40 as a one-piece model. With all that said, let's get on with the building.

FUSELAGE

To start, I cut out all the parts required to form a kit, and then I begin assembly. Start by gluing the doublers to the fuselage sides, and then glue the stringers into place only in the doubler areas. Add the firewall/motor mount to one side, and use a triangle to be sure it is square to the side. Tack-glue former F2 to the side, and install the ¼-inch vertical pieces ahead of the wing saddle. Place the other fuselage side on top of the assembly, and glue it into place. Now add the ¼-inch crosspiece in front of the saddle. Draw the location of the stringers on the rear of the fuselage using the plans for reference. Slide former F3 into place, make sure the fuselage is straight, and then glue it all together. Put

FLIGHT PERFORMANCE

TAKEOFF AND LANDING

A decent wings-level toss gets the P-40 on the way without any effort. With 60 ounces of static thrust available, the thrust is significant. Start with a few clicks of up-trim to be safe. You can always trim it out later. After a hand launch, the model climbs skyward with authority. That huge prop up front looks great and pulls a lot of air over the wing and tail. Control response is good!

To bring it back down, simply line it up with the runway and cut the power. The P-40 glides well, but that big air scoop in the nose adds a bit of drag. To get used to the sink rate, I suggest a flyby at landing speeds at a safe altitude before you shoot the first landing.

HIGH-SPEED FLIGHT

The model flies very well at speed and penetrates fairly well. The performance available from that $30 RC car motor really surprises people. I estimate top speed at level flight to be about 55mph. The model looks scale, handles nicely and exhibits no bad habits.

LOW-SPEED FLIGHT

The P-40 does a decent job here—a result of its light wing loading and wingtip washout. Stalls are preceded by a loss of aileron effectiveness followed by a wing drop to the left. The model has a nice flat glide, so don't worry about bringing it in with a dead battery pack.

AEROBATICS

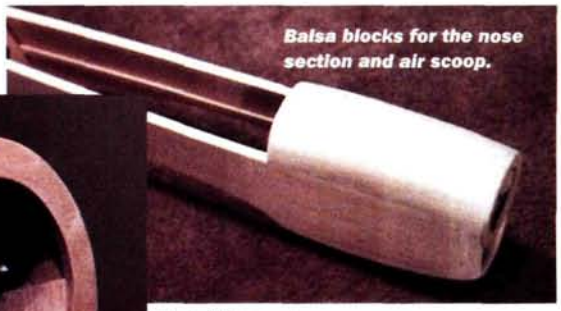
The P-40 can do many aerobatics that don't require rudder. It does, however, look its best during scale maneuvers. Loops, even later in the flight, are nice and big. I have even done outside loops after 4 minutes of flight. Rolls look very cool, especially after a low strafing run. Inverted flight requires about ¼-inch down-stick to hold the nose up, but other than this, it handles very nicely. It can also do nice Cuban-8s, Immelmanns, split-S's and just about anything else you like.

Once the sides have been assembled and the top stringer attached, trim the rear turtle-deck sheeting and glue it into place.

the top rear stringer in place, wet the fuselage sides and bend them over on top of the stringer. Cut the excess sheeting off, and glue the sheeting onto the stringer. Along the inside bottom edge of the fuselage sides, glue the triangle balsa stock flush with the bottom edge, and cover the bottom with 1/16-inch cross-grain sheeting.

FRONT AIR SCOOP

Cut the top and bottom blocks to shape and tack-glue them into place. Install the motor, gearbox and spinner so you can locate the position of the nose ring. Trace the nose ring onto the front of the blocks, and carve them to shape. Keep in mind that the real aircraft was not totally round on the top but had a slight flat area at the center. Once the shape is correct, pop the blocks off and remove the inner material with a motor tool. I use the sanding drum, and hog out the excess balsa until I have about a 3/16-inch wall thickness. After you've lightened the nose blocks, glue them back into place and glue on the ply nose ring. Next, glue on the 1/2-inch-balsa nosepiece to form the front of the air scoop. If you are going to use medium to hard balsa anywhere on this model, this is the place; it takes a beating on landings. Finish by giving the whole fuselage a good sanding to make everything smooth.

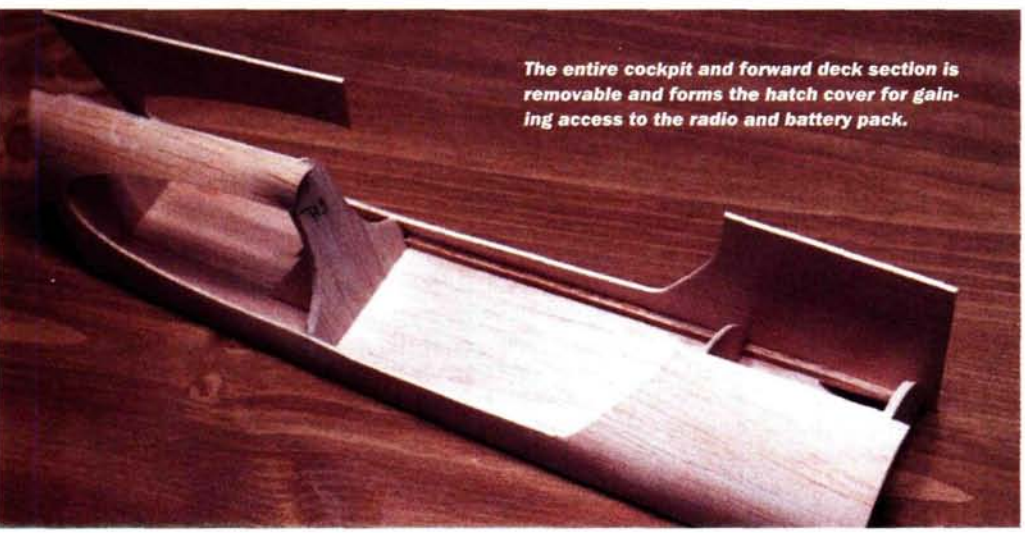


Balsa blocks for the nose section and air scoop.

Install the motor and gearbox so you can correctly position the ply nose in the front of the nose blocks. After you've added the front 1/2-inch sheeting, carve and sand the engine cowl to shape.

MAIN HATCH

The hatch is built in place on the fuselage. Cut the floor out of 1/16-inch sheet, and add the 1/8-inch stringers along its sides. Set these in 1/16 inch from the edges to allow for the outer sheeting. Next, glue the formers H1 through H4 into place. Glue the gussets into place, and add the 1/4-inch stringers to the top. Sheet the hatch with 1/16-inch balsa; then, using the plans as a guide, cut a template for the rear quarter-window cutout areas. To fill in the cutout area, glue styrene plastic sheet into place with medium CA. I use plastic in this area because it is a P-40 focal point, and the plastic eliminates any wood grain that would otherwise have to be filled and sanded smooth! I used Goldberg hatch latches to secure the hatch in place. Make sure that the hatch fits tightly yet is still easy to remove without damaging it in the process. Add some cockpit details, a pilot bust, a headrest, and you've finished. The Hangar 9 1/10-scale U.S. WW II pilot fits in the cockpit nicely! You can easily mold the canopy yourself or use the front of a Sig WW II canopy.



The entire cockpit and forward deck section is removable and forms the hatch cover for gaining access to the radio and battery pack.

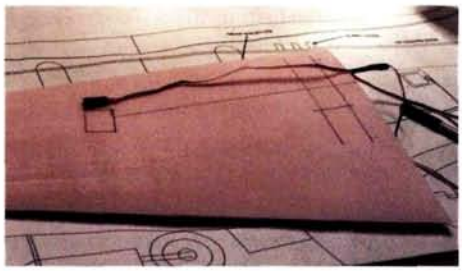
TAIL AND WING

The tail feathers are made from simple 1/8-inch balsa sheet. Nothing too complicated: just cut to shape, sand, and hinge the elevators to the stab. Glue the stab onto the fuselage first, then add the fin; use a triangle to ensure that the fin is 90 degrees to the stab. Make the surfaces light and straight. Add the filler-block pieces in the area above the stab, and that's it. The prototype has no rudder, but if you prefer to have one, it isn't hard to add. Your model will be heavier, though, because of the additional servo.

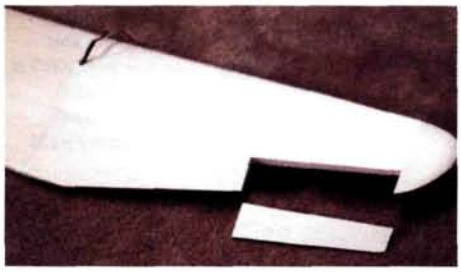
The wing consists of a pink foam-core and 1/32-inch sheeting. Do not use white foam; it doesn't have the compression strength of pink foam. Lightly sand the cores after you've cut them to shape. Mark the locations of the wiring, servo cutouts and finger holds, then use a knife to cut them out. Put the aileron servo Y-harness in both cores before you sheet them. Use the foam-core beds for support and sheet the bottom surfaces. Then mark the cutouts with pinpricks so you can find them later. Now sheet the top of the cores. I use Southern Sorghum to attach the sheeting to the foam. You can add carbon-fiber filament tape to the cores before sheeting, if you like, but I have never seen the need. When both wing panels have been sheeted, join them in the center with the proper dihedral, as indicated on the plans.

Add the balsa wingtip blocks and the leading edge; then trim the center trailing-edge area until the wing fits nicely into the fuselage's wing saddle. Sand the entire wing smooth, then cut out the aileron servo wells and finger-hold openings. Line the front of the finger holds with 1/8-inch balsa and with 1/16-inch balsa on the other three sides.

Wrap the center dihedral joint with 1/2-inch-wide nylon or fiberglass tape and add a light coat of epoxy. Mark the locations for the ailerons with a felt-tip pen, cut them out of the wing, and add



Cut out the foam wing-cores for the wire leads and servo wells before you cover them with the balsa sheeting.



The ailerons are cut from the wing after it has been sheeted and the wingtips have been shaped.

The completed model ready to be covered. Note the finger-hold wells inboard of the dummy landing-gear struts.

trailing-edge sheeting. Bevel the fronts of the ailerons (cut the foam back to allow for the sheeting), and then sheet their fronts and ends.

FINAL ASSEMBLY

Place the wing in the saddle and check the fit. There is no substitute for a tight wood-to-wood joint! Trim and sand the saddle until you achieve a good fit without any gaps. When everything fits properly and the wing incidence is correct, epoxy the wing to the fuselage. Recheck the alignment between the wing, fuselage and stab.

Before you build the big wing fillets, you must first glue on the small fuselage bottom pieces. Then cut the fillet from soft 1/16-inch balsa. Make sure that the wood grain faces about 30 degrees inward toward the fuselage. Wet the fillet sheeting (on the inside) before you install it, and it will form nearly to the perfect shape. Once it has been formed, glue the fillets into place. I used a little bit of Model Magic on the edges and tapered them nicely into the fuselage and the wing.

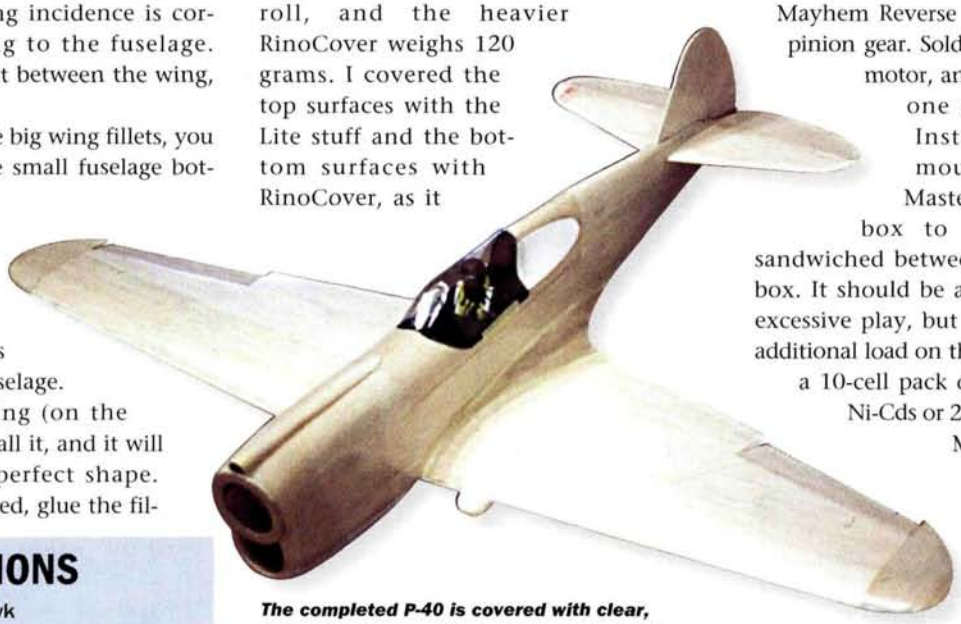
SPECIFICATIONS

MODEL: P-40 Warhawk
TYPE: electric scale
WINGSPAN: 42 in.
WING AREA: 318 sq. in.
WEIGHT: 45 oz.
WING LOADING: 20.45 oz./sq. ft.
MOTOR USED: Kyosho Magnetic Mayhem with 3.5:1 Master Airscrew gearbox
POWER SYSTEM: 10-cell Ni-Cd or NiMH pack with a 30A ESC with BEC
PROP USED: 12x10 APC electric
RADIO REQ'D: 3 channels (aileron, elevator, throttle)

COMMENTS: designed by Mark Rittinger, the P-40 Warhawk is an easy-to-build, high-performance sport-scale model of the classic WW II fighter. It uses a simple, built-up balsa and ply fuselage and a foam-core wing sheeted with balsa. No rudder is required, and to minimize drag, there is no landing gear.

COVER AND FINISHING

I usually cover my electric models with paintable clear MonoKote, but for the P-40, I used a material called OzCover Lite from Prop Shop Hobbies. It is very light, tough and paintable without any prep. It only weighs 66 grams per 2-meter roll, and the heavier RinoCover weighs 120 grams. I covered the top surfaces with the Lite stuff and the bottom surfaces with RinoCover, as it is a bit heavier and tougher. It stretches, sticks in place and shrinks very well. After I had covered and hinged the control surfaces, I sprayed the bottom surfaces with Testors Model Master Camouflage Gray and the top with Rustoleum Olive Drab Green.



The completed P-40 is covered with clear, paintable OzCover Lite heat-shrinkable film.

With electrics, there's no need for fuel-proof paint! You can use whichever paint you want that's the right color. For markings, I used graphics from Major Decals, and I painted the shark's mouth by hand.

RADIO AND HARDWARE

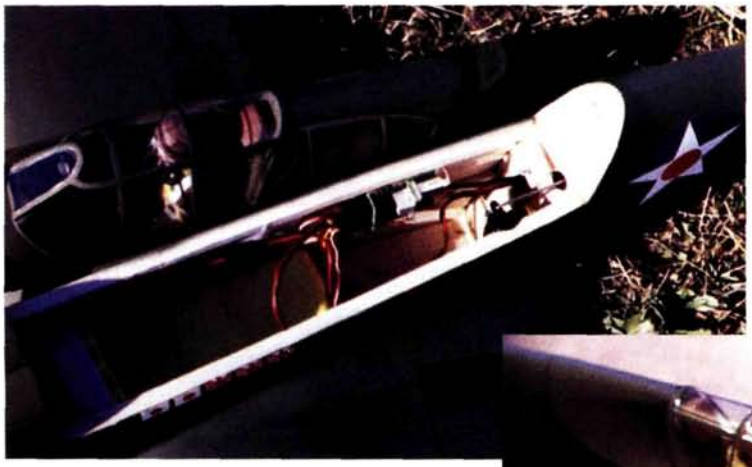
You'll need at least a 3-channel radio for throttle, aileron and elevator control. Use lightweight servos, but don't use super microservos; you'll need at least 20 oz.-in. of output torque to adequately control the model. If you power your model with the same motor as I have used, you'll need a good 30A ESC with a BEC circuit. Solder the capacitors to the back of the Magnetic Mayhem Reverse motor, and install the pinion gear. Solder the ESC wires to the motor, and use an in-line fuse in one of the power leads. Install the motor in the mount, and attach the Master Airscrew 3.5:1 gearbox to it. The firewall is sandwiched between the motor and the box. It should be a tight fit without any excessive play, but not so tight as to put additional load on the motor. I typically use a 10-cell pack of 1250SCR or 1300CP Ni-Cds or 2000 NiMH cells.

My setup, turning a 12x10 APC electric prop, pulls about 22 to 24 amps wide open. Don't go to a bigger prop; 25 amps is the practical limit for the Magnetic Mayhem motors.

To save weight, I vacuum-formed a lightweight plastic spinner over a standard Du-Bro spinner. To see how I did it, check my "How to" article in the December 2002 issue. After the drive system has been installed, check the CG, control-surface deflection and direction. All that's left to do is to charge the batteries and head for the flying field!

AT THE FIELD

I just love this part! It's what all that work is for—flying! Do a motor-on range-check. Peak the battery pack again, then, with the help of an assistant, launch the plane slightly nose high and wings level at full



With the main hatch open, you can see how easy it is to reach the radio gear and main battery pack.

The main hatch cover/canopy section fits precisely in place on top of the fuselage.

power directly into the wind. Right away you should notice the static pulling power available from the recommended power system. Even if the launch is a bit wobbly, there's enough "juice" to pull the model out of a bad situation. Trim it out, get a bit used to the control response, and try a practice landing approach. Bring the model down before power runs out on the first flight so you have some reserve power to go around, if you must.

I really hope you enjoy this P-40! It has been a fun and challenging model to design, and it sure looks great in the air. Good luck and good flying!

APC Props; *distributed by Landing Products (530) 661-0399; apcprop.com.*

Carl Goldberg Products *(678) 450-0085; carlgoldbergproducts.com.*

Hangar 9; *distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.*

Kyosho Magnetic Mayhem; *distributed by Great Planes Model Distributors Co. (800) 637-7660; kyosho.com.*

Major Decals; *distributed by Northeast Screen Graphics (413) 525-7465; majordecals.com.*

Master Airscrew; *distributed by Windsor Propeller Co. (916) 631-8385; masterairscrew.com.*

Model Magic; *distributed by Dave Patrick Models (815) 457-3128; davepatrickmodels.com.*

MonoKote; *distributed by Great Planes Model Distributors Co. (800) 637-7660; greatplanes.com.*

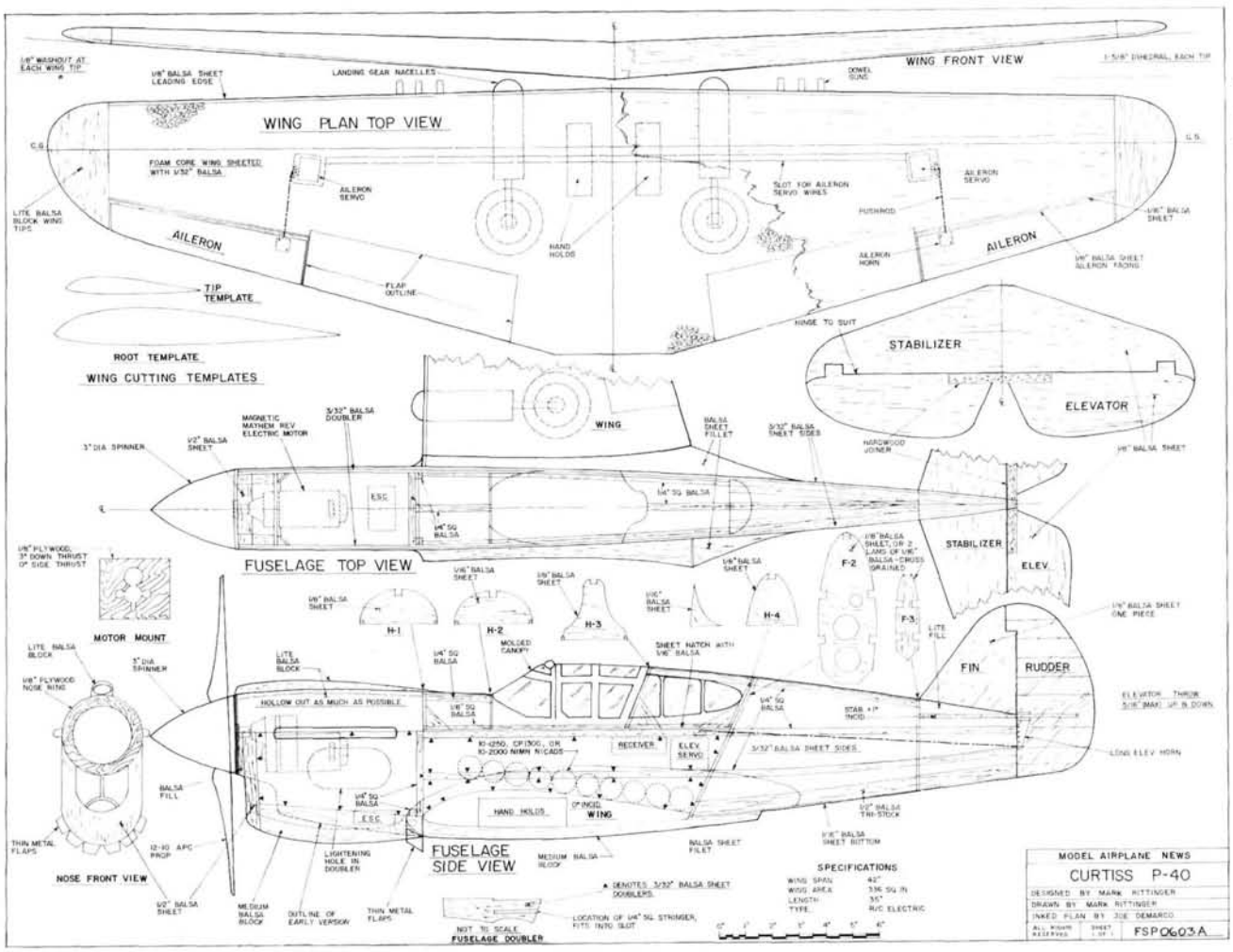
Prop Shop Hobbies Inc. *(586) 757-7160; prop-shop.com.*

Sig Mfg. *(800) 247-5008; sigmfg.com.*

Southern Sorghum; *distributed by Dave Brown Products (513) 738-1576; dbproducts.com.*

Testors Corp. *(815) 962-6654; testors.com.*

click trip MODELAIRPLANENEWS.COM FOR BUILDING MATERIALS LIST



To order the full-size plan, turn to "RCStore.com" on page 156.

Electric Curtiss P-40 FSP0603A

Designed by Mark Rittinger, the P-40 Warhawk is an easy-to-build, high-performance sport-scale model of the classic WW II fighter. It uses a simple, built-up balsa and ply fuselage and a foam-core wing sheeted with balsa. No rudder is required, and to minimize drag, there is no landing gear.

WS: 42 in.; power: geared Kyosho Magnetic Mayhem motor; 3 channels; LD 2. $19.95

Repair Foam-core Wings

A quick and easy fix by John Reid

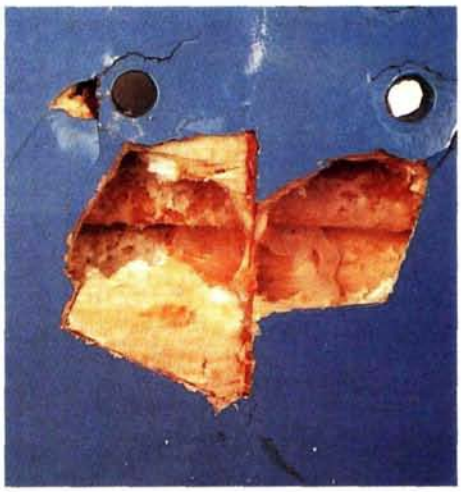
Model aircraft are made of a wide variety of materials: they may have built-up balsa construction or be made entirely of foam. Many have a fiberglass fuselage and balsa-sheeted foam-core wings. These are quite durable, and this is fortunate because fiberglass fuselages and foam-core wings are somewhat more difficult to repair than balsa.

My Little Toni 1/4-midget pylon racer suffered from a fuel seepage that dissolved part of the wing's foam-core. This weakened the wing greatly, and I was forced to retire the model. After it had sat in the rafters for years, I decided to pull it down and repair it. The following steps describe how I mended the middle of the foam-core.

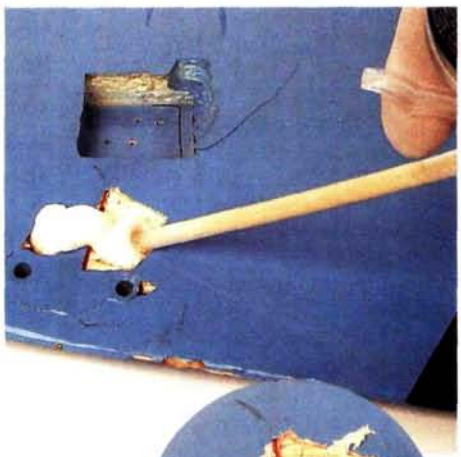
1

YOU'LL NEED

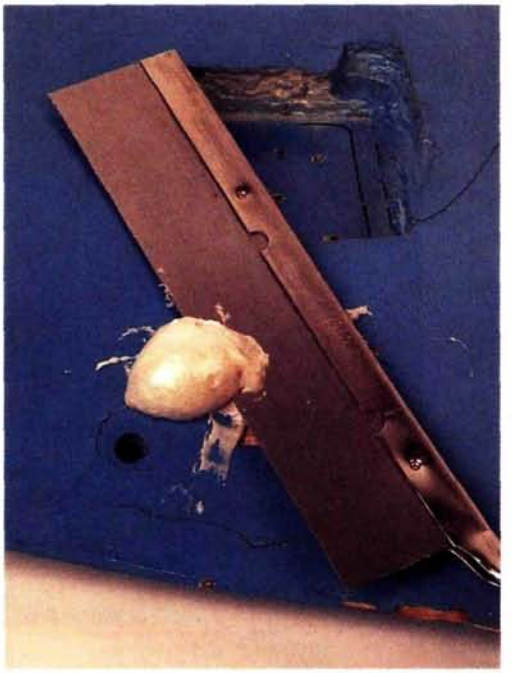
- Hobby knife or saw
- Needle-nose pliers or tweezers
- 5- and 30-minute epoxy
- Insulation foam in a can (the minimal-expansion kind)
- Palette knife or Popsicle stick
- Sandpaper
- Thinning alcohol
- Fiberglass cloth
- Masking tape
- Wet-and-dry sandpaper, 320- and 600-grit
- Tack cloth
- Rubbing alcohol
- Electrician's tape
- Brown wrapping paper
- Primer and matching paint



2 The damage was caused by fuel seeping in through a crack and dissolving the foam-core. Very little of the wing's outer surface was damaged, but the damage in a central high-stress area must be repaired. Begin by cutting away the balsa skin to expose the damaged foam, which you then remove with needle-nose pliers or tweezers.



3 This wing's underside also has small cracks and splits; fill such cracks with 5-minute epoxy and let it cure fully. Slowly spray a little canned foam into the damaged area. Don't use a lot of foam; if you spray too much into a model structure, its expansion will cause damage; a little goes a long way! The foam will fill the cavity, and any excess will overflow and cure on the outside of the wing. Let the foam set for a couple of minutes, and then remove any excess with a palette knife or a Popsicle stick.



4 The foam continues to expand until it has completely dried. Remove the excess dried foam with a hobby saw or knife and then sand it flush with the wing's surface. Apply a coat of 30-minute epoxy thinned with alcohol over the repaired area, and cover it with a layer of fiberglass cloth. Here, I covered the entire center section. Brush on a second coat of thinned epoxy to fill the fiberglass cloth's weave, and let it cure completely. Use masking tape to prevent the epoxy from getting on surfaces where it isn't required.

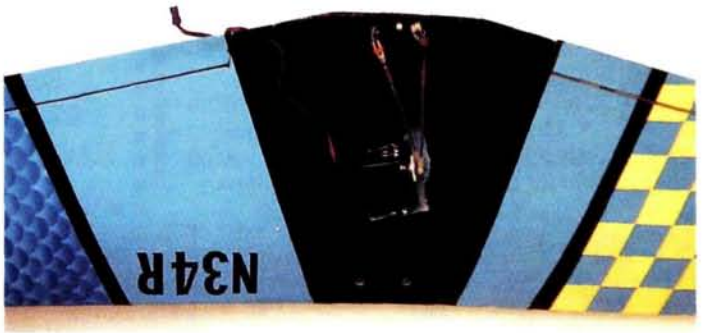
5 After the epoxy has cured, sand the repair with 320- and then 600-grit wet-and-dry sandpaper. Feather the edges of the fiberglass cloth so there is a smooth transition between it and the rest of the wing. If you sanded too much in some areas, apply another thin coat of epoxy to fill them, and sand them smooth when the epoxy has cured. When you have sanded the repair smooth and the fiberglass cloth's weave doesn't show, you're ready to mask and repaint the repaired area.

6 Remove the protective tape, and use a tack cloth to wipe away any sanding dust left on the wing. Clean the wing with rubbing alcohol, and use electrician's tape to mask the repaired area. Electrician's tape leaves a cleaner edge than masking tape, and very little paint will seep under it. Use brown wrapping paper to protect the rest of the wing from overspray.

7 First apply two coats of primer and let it dry. Wet-sand between the coats to remove most of the primer before you spray on the next coat. I sprayed on a total of four coats, and when the final coat had been allowed to dry overnight, I wet-sanded it with 600-grit wet-and-dry sandpaper. To prevent the primer from sticking to the tape's edges, lightly sand its edges before you remove it. Let the wing dry completely after you wet-sand it, or the moisture will cause the paint to blush. Spray on two light finish coats, letting the first layer dry before you apply the second one. Apply one last, slightly heavier coat so that the surface of the repaired area will flow outward and produce a "wet" appearance.

8 When the paint has dried completely, remove the masking tape and paper.

To ensure a sharp paint line, remove the electrician's tape by pulling it back slowly over itself. This action cuts the paint smoothly and avoids making jagged edges. You can hardly see where the repair ends.



That's it; sit back and admire your repair. My Little Toni is ready to race again, and you'd never know it had been damaged. With some simple tools, supplies and a little time, you can easily repair a damaged foam-core wing; and remember, it's always better to repair a wing than to build a new one! ✈

LustreKote; *distributed by Great Planes Model Distributors (800) 637-7660; greatplanes.com.*
Kwik Bond Epoxy; *distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.*

by Martin Robinson

SPECIFICATIONS

MODEL: P-51D Mustang
MANUFACTURER: Megatech Intl.
TYPE: electric ARF/RTF
WINGSPAN: 32.75 in.
WING AREA: 170 sq. in.
WEIGHT: 19.2 oz.
WING LOADING: 16.3 oz./sq. ft.
DRIVE SYSTEM USED: Speed 400 with gear reduction (included)
RADIO USED: Futaba FP-8UAP transmitter, Cirrus MRX-4 FM receiver and 2 Cirrus CS-10BB sub-microservos
SPEED CONTROL USED: AstroFlight 215
BATTERY USED: 8-cell, 500mAh Ni-Cd
FLIGHT DURATION: 4 min.
PRICES: $109 (ARF), $249 (RTF)

Megatech's P-51D Mustang—one potent pony!

The Mustang has been re-created many times in RC aircraft, but Megatech has made its quick-building little Mustang ARF one of the easiest to construct while maintaining a scale appearance. If you want to fly a great-looking, backyard-size warbird that requires little assembly time, the Megatech Mustang is definitely worth a look.

ASSEMBLY

After I installed the radio, servos and a few screws and tape, it was time to attach the 4-blade propeller that's included with the kit. Most other Mustang models' scale appearances are marred when it comes to the propeller, but the 4-blade prop really finishes off this model. The ball-bearing-supported gear reduction on the Speed 400 motor provides ample power behind this prop.

FLYING THE MUSTANG

For the first flight, I had a helper hand-launch the Mustang. The motor is very powerful, and the model almost flies out of your hand. You need to give it a running throw, or it will be difficult to control until it reaches flying speed. It's also necessary to give it a good, straight-and-level throw. After the plane reached full flying speed, I trimmed it out with a little down-elevator and right rudder to achieve straight and level flight. After the trim had been dialed in, I felt comfortable launching the model myself.

I pulled back on the elevator after the Mustang reached flying speed and was impressed by its climbing performance. The 8-cell Ni-Cd battery pack I used provided more than enough power for the weight. At full throttle, it climbs indefinitely at about 25 degrees. I found myself backing off on the throttle more than I do with some other park flyers; I enjoy any electric plane that has more than enough power.

The Mustang comes with rudder and elevator control; both have good authority once the plane gains some airspeed. At full throttle, the Mustang really screams; at ½ to ¾ throttle, it slows down yet still has plenty of power to stay in the air. Light gusts were no problem, and up to 10mph winds still wouldn't be a concern. The assembly manual includes step-by-step instructions to add optional ailerons, and they would make it more maneuverable and give finer control, but make sure that you use the lightest servo you can find. Stalls are level and uneventful and give plenty of opportunity to recover without incident.

I made the first couple of flights in a large field, then moved to a smaller area about the size of a soccer field. I had fun doing strafing runs, hammerheads and loops. Landings are completely uneventful, as long as you keep the airspeed up until the plane is a couple of feet above the ground. Then just cut the throttle and let it glide down and land on its belly. The fuselage is made of a durable plastic, as is the air scoop under the wing. They are tough enough to take an unlimited number of landings

on grass. The plane will land on dirt or pavement just fine, as long as you don't mind a few scratches on the fuselage.

The Megatech Mustang is probably the fastest-building ARF that I have ever worked with. It went from box to ready to fly in less than 2 hours. The pre-applied decals and the 4-blade propeller add to its scale appearance, but the real payoff is in the air. Given its small size and scale dimensions, this little Mustang's handling is really impressive. The level of convenience, scale look and satisfying performance all add up to a winning combination for any backyard flier who has a fondness for the legendary P-51 Mustang.

AstroFlight Inc. *(310) 821-6242; astroflight.com.*

Cirrus; *distributed by Global Hobby Distributors (800) 854-8471; (714) 963-0133; http://cirrus.globalhobby.com.*

Futaba Corp. of America; *distributed by Great Planes Model Distributors Co. (800) 637-7660; futaba-rc.com.*

Megatech Intl. *(201) 662-2800; megatech.com.*

TURNKEY OPTION

Megatech offers this scale-looking P-51D in a ready-to-fly (RTF) version. The ARF is a fast build, but if you want to get in the air even faster, you may want to try the RTF. This hot little Mustang comes fully assembled; the geared Speed 400, ESC and radio gear are all installed. It includes a 2-stick, 3-channel transmitter, a 7-cell NiMH battery pack and a DC timer charger, all for $249. All you'll need to add are wide-open skies and some AAs for the transmitter.

Ultimate champ

Chip Hyde's 2002 TOC-winning Ultimate bipe is an impressive model! You can have one just like it; it's an ARF from Aeroworks!

By now, almost everyone who reads this column knows that the winner of the 2002 Tournament of Champions (TOC) aerobatic competition was Chip Hyde of Sierra Vista, AZ, and that he flew a 42-percent-scale Ultimate biplane at the 18th and final Las Vegas event. Chip's Ultimate was the only bipe at the TOC, and I thought it would be neat to take a closer look at this impressive aerobat from Aeroworks.

Designed by Chip, the new Aeroworks Ultimate 10-300 biplane is an ARF! That's right; you can order it in either ARF or almost-ready-to-cover form. A Desert Aircraft DA-150cc twin cylinder is the engine of choice for this impressive biplane, and the completed model weighs 38 pounds. The two-piece wing design (top and bottom) and two-piece, removable stabilizer allow quick field setup, and the flying-wire reinforcement that Chip used on his competition plane enhances down-line braking flight performance and increases the model's overall strength. The tail surfaces have airfoil cross-sections, and the traditional balsa, sheeted-foam and lite-ply construction is extremely lightweight and strong for a model of this size.

Aluminum landing gear, a molded-fiberglass engine cowl and wheel pants, aluminum wing and stabilizer joiner tubes, aluminum center cabane struts, a formed canopy and built-up interplane struts come with the kit. The wing center sections, outer wing panels, horizontal stabs, elevators, fin and rudder have foam-core construction and come sheeted. All the control surfaces come slotted and hinged for CA-type hinges and are ready for th control surfaces to be glued into place. The ARF version come covered in Ultracote and is available in Chip's famous pink an white color scheme and in a red and white scheme.

Chip and crew assemble his Ultimate 10-300 at the 2002 TOC competition.

CHIP'S TOC WEAPON

The Ultimate kit comes set up for 4 elevator servos (2 for each half), 2 servos for each aileron (8 total) and 3 for the rudder (Chip used 2 jumbo 5050 Futaba rudder servos). For control, Chip uses a Futaba 9Z transmitter, Futaba 9151 servos for ailerons, 9206s for elevator and dual receivers powered by 4000mAh Powerflite lithium-ion batteries. Powered by a prototype DA-200 4-cylinder engine turning a 32x10 prop, Chip's Ultimate bipe has a final weight of 41 pounds. The control surfaces are extra large for excellent 3D maneuvering. Since Chip designed the prototype model, you know it has to fly and respond well to commands. To read what Chip has to say about flying his impressive Ultimate bipe, take the click trip.

click trip
MODEL AIRPLANE NEWS.COM

Specs

Wingspan: 98 in.
Length: 104 in.
Wing area: 3,300 sq. in.
Weight range: 38 to 40 lb.
Engine range: 150 to 200cc
Spinner size: 6 in.
Price: $1,995 ARC; $2,395 ARF

CHIP'S ULTIMATE ENGINE

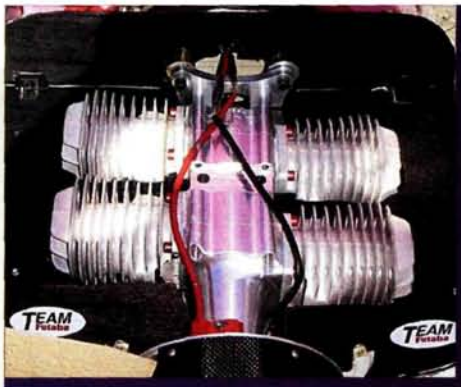
For the 2002 TOC, Chip wanted horsepower but, more important, he wanted the neat sound and ultra-smooth throttle response of a 4-cylinder engine. The DA-200 that powered his Ultimate bipe was a prototype, and two engines were built. The cylinders, pistons, rods and most of the forged crankshaft parts were from the DA-100 engine line.

The first engine was completed about three weeks before the TOC competition; the second was finished only five days before the contest. Desert Aircraft didn't want to waste time building a second one if the first one didn't work out!

The first one ran flawlessly until two days before the contest, when the front of the engine suffered a non-flying impact. During the next flight, the timing sounded bad and Chip had to park it. He later learned that the front-to-rear rod/pin union had been forced back, and during flight, it was pulled forward again. This made the crank loosen a bit and caused the timing to become a few degrees out of sync between the front and rear cylinders. (Production engines will use stronger shaft and rod/pin unions.)

Chip switched to the backup engine and ran it for seven or eight flights before the contest. This was nowhere near enough time to fully break in the engine, but it performed well. Most people who saw the engine at TOC raved about its performance and appearance. Desert Aircraft's Dave Johnson commented that the overall timing of all four cylinders was not quite as nice as in the first one, but the backup/winning engine is still running great, and Chip plans to fly several demos with it soon.

To ensure that the smallish DA-100 rod pins wouldn't twist under the loads of the 200cc engine, they were expertly welded into place by Greg Edmonds. Desert Aircraft machinist Mark Gaines did all the custom crankcase work. Future production assembly fixtures and methods will ensure consistent and accurate crank timing.



The power for Chip's Ultimate comes from an experimental Desert Aircraft DA-200 4-cylinder engine.

Engine specs

Length: 10 in.
Width: 11.5 in.
Stroke: 1.3779 in. (35mm)
Bore: 1.6771 in. (42.6mm)
Weight: 10.8 lb. (production versions will be a bit lighter)
Intake: 2 Walbro carbs with 2 reed valves
Hp: plenty! (never dyno-tested but estimated to be 18 to 19hp)
Recommended props: 32x10, 32x12, 34x10, 34x12, 36x10

Features: forged-steel crankshafts and rods; single-ring, domed pistons; CNC-machined 7075 crankcases. The two front cylinders fire 180 degrees opposite to the rear two.

Comments: to suit his flying needs at TOC, Chip used 32x10 and 32x12 props, typically turning at 6,200rpm. The prop tips easily "ripped" at full throttle, and Chip went through several of them during the contest.

Editor's note: thanks to Dave Johnson for supplying the technical information on the DA-200 engine.

THE LATEST IN GIANT-SCALE AIRPLANES

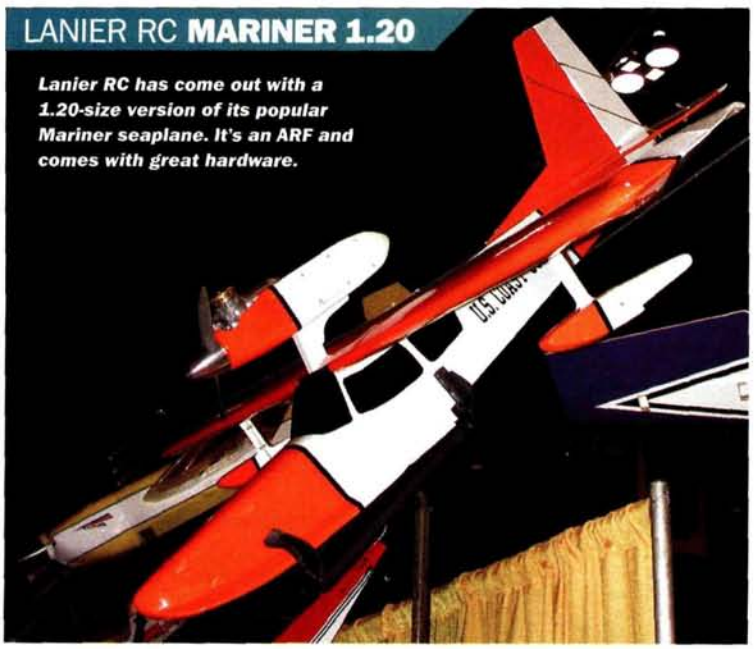
ZIROLI BEECHCRAFT STAGGERWING

Recently, I attended the 35th annual Westchester Radio Aero Modelers (WRAM) trade show in White Plains, NY, and saw some really nice giant-scale models. One of the more exciting models on display was the still unfinished Beechcraft D-17 Staggerwing bipe suspended over the Nick Ziroli Plans booth. Designed by Nick Sr., the Staggerwing is an impressive example of traditional balsa-and-plywood construction. Using his tried-and-true designing technique, Nick's newest warbird (yes, he plans a scale military paint scheme!) is 22.5 percent scale and has an 86-inch wingspan. The fuselage is 72 inches long, and the wing area is 2,350 square inches. Its finished weight should be about 30 to 35 pounds. It will be powered by a Zenoah G-62 gas engine, and Robart has a set of electric retracts for it. On display next to the Ziroli Plans booth were the shock-absorbing, fully articulated retracts that operate in exactly the same fashion as the full-size gear do. A long jackscrew drives the gear up and down, and microswitches stop the motion in the full-up and full-down positions. Transition time is about 8 seconds—very scale-like! The Staggerwing's tailwheel is a standard mechanical Robart retract and is servo-operated. Nick says that he plans to cover the D-17 with Stits Lite from F&M Enterprises and will also use Poly Tone paint products (from F&M, as well) to finish the giant biplane. Nick uses low-profile Airtronics servos in the top for the ailerons and lower wing flaps. Work on the plans is progressing, but the plans won't be finished until sometime next year. For more information on other Nick Ziroli designs, check out the website: ziroliplans.com.

Above: Nick Ziroli's newest design is this impressive Beechcraft D-17 Staggerwing. Right: Robart manufactures these electrically driven retracts for the Staggerwing. A jackscrew drives the shock-absorbing struts and locks them into place.

LANIER RC MARINER 1.20

Lanier RC has come out with a 1.20-size version of its popular Mariner seaplane. It's an ARF and comes with great hardware.



I also saw a great ARF seaplane high over the Lanier RC booth. Part of Lanier's 21st Century line of ARFs, the Mariner 1.20 is designed for easy water takeoffs and landings. Designed by Jerry Smith, the model is intended for .90 to 1.20 2-stroke or 1.20 to 1.80 4-stroke engines, and it has spray rails and hull lifters to quickly get it "up on step" before it leaves the water.

The kit comes with a built-up balsa-and-plywood wing and hull/fuselage; the hull is fiberglass reinforced. The engine pod is above the wing, and the pylon is secured through the fuselage to the base of the hull for strength. Fiberglass tip floats help stabilize the airplane on water. The entire model comes completely finished with iron-on covering, and the fiberglass engine pod and wing floats have been painted to match one of the three color schemes; they're available in orange and white, red and white and yellow and white.

The Mariner 1.20 includes 4-40-size flight-control mechanisms, carbon-fiber pushrods and metal clevises and hardware from Du-Bro, Sullivan and Robart. Its wingspan is 80 inches, and its wing area is 1,140 square inches. If you ever wanted to fly off water, the Lanier Mariner—with a street price of $599.99—looks like a winner!

Sometimes, it's the little things that get me the most excited, and the new F1 Fueler from Slimline is one of those things you just gotta have. Available for both glow fuel and gasoline, this well-made fuel fitting is machined out of aluminum and differs slightly from the rest. The port is permanently secured to the fuselage and to the filler fuel line and uses an O-ring-equipped cap to seal the fuel system. Remove the cap, and a filler nozzle attached to your fuel supply line fits precisely into place for hands-free fueling and defueling. To avoid having to use a separate filler line in my new G-26-powered Hangar 9 Super Cub, I attached the F1 Fueler to the engine fuel line with a short length of fuel tubing and a T-fitting. The Walbro pumper carb on the G-26 prevents it from flooding while refueling the tank—a neat and simple setup!

There was a lot more neat big-bird stuff at the WRAM show, but I don't have enough space to show it all. Keep an eye open in a future issue for all the great products coming our way. Until next time, keep thinking big! ✈

Above: Slimline's F1 Fueler system is a great way to fill and empty your model's fuel tank. The O-ring-sealed fittings are available for both glow and gasoline fuel systems! Right: here's the sealed F1 Fueler installed on my Hangar 9 Super Cub. Far right: with the cap removed, the fueling nozzle snaps right into place for spill-free fuel transfer.

***Aeroworks** (303) 366-4205; aero-works.net.*
***Airtronics** (714) 978-1895; airtronics.net.*
***Desert Aircraft** (520) 722-0607; desertaircraft.com.*
***F&M Enterprises** (817) 279-8045; stits.com.*
***Lanier RC** (770) 532-6401; lanierrc.com.*
***Nick Ziroli Plans** (516) 467-4765; ziroliplans.com.*
***Powerflite**; distributed by Skyborn Electronics (972) 267-5099; rcpowerflite.com.*
***Robart Mfg.** (630) 584-7616; robart.com.*
***Slimline Mfg.** (480) 967-5053; slimlineproducts.com.*
***Zenoah**; distributed by Horizon Hobby (800) 338-4639; horizonhobby.com.*

2-needle, 2-speed engines and more

Readers continue to submit letters with questions concerning all phases of miniature-engine technology. This month, the roots of RC speed control will be investigated along with gummed-up engines and the value of nitromethane in the fuel blend.

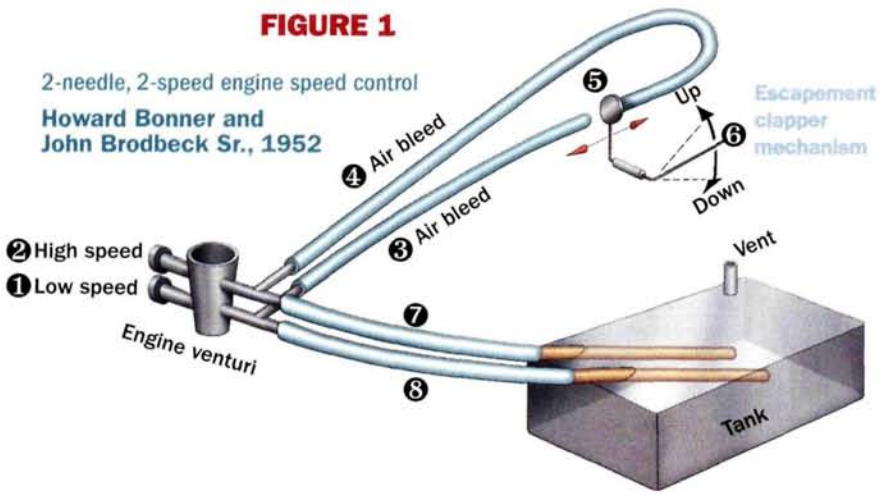
2-SPEED GLOW ENGINES

Douglas Leaman of Anchorage, AK, writes, "A friend asked how a vintage K&B .19 (green head) 2-speed engine operates. I saw a photo of the engine, and it looks like a standard control-line engine with 2-needle valves (one above the other). I haven't a clue. Any ideas?"

Douglas; since high- and low-speed systems were used on spark-ignition engines after WW II, it didn't surprise anyone that the first glow-engine "throttles" were also 2-speed units. Bonner Specialties of California developed one of these systems for single-channel radio-controlled models while collaborating with K&B cofounder Johnny Brodbeck Sr. In 1952, Howard Bonner marketed the first "motor-control escapement," while K&B mass-produced the revolutionary 2-speed Torpedo .19. The engine featured twin needle-valve assemblies that were attached one above the other through an extended venturi. The needle valves were controlled by a unique system of air vents, which produced the high and low speeds (see Figure 1).

With the escapement*-actuated control lever (6) in the down position, the clapper valve (5) moves to the rearward position, allowing air to pass through a tube (3) to the low-speed needle valve (1), interrupting its fuel flow. This happens because atmospheric pressure forces air through a tube much more easily than it can force the dense liquid fuel; have you ever tried sucking soda through a straw with a hole in its side? At the same time, the clapper valve (5) has a sealed tube (4), so fuel flows through the delivery line (7) to the high-speed needle valve (2) that is adjusted for peak rpm.

FIGURE 1



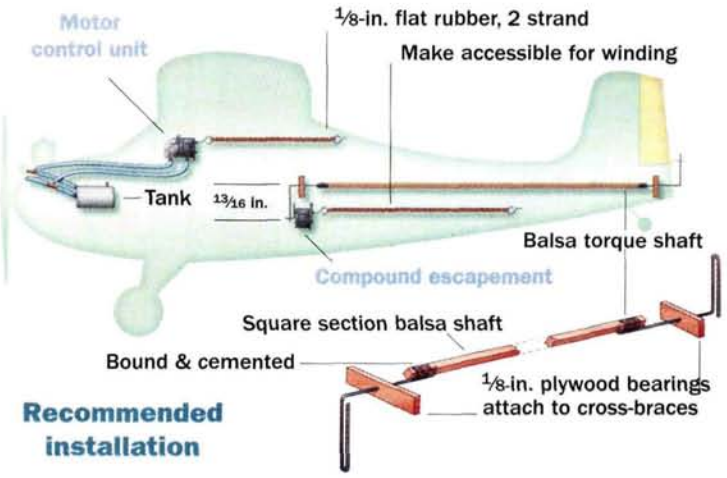
Bonner-Brodbeck 2-needle, 2-speed engine speed control.

Shifting the control lever (6) upward causes the clapper valve (5) to interrupt fuel flow to the high-speed needle valve (2) by allowing air to flow through the tube (4). At the same time, the tube (3) is sealed off, causing fuel to flow through the tube (8) to the low-speed needle valve (1) that is adjusted for rich (low rpm), 4-cycling operation.

*Bonner's original control unit used a rubber valve (clapper) to open and close the vents; it was actuated by an electromechanical device known as an escapement that was powered by a twisted length of natural rubber, as with a rubber-band-powered model airplane.

The rpm difference between the peaked and richened needle valves provides the high and low speed. Shifting the control lever to a centered position leaves both air-control vents open and causes the engine to quit after two or three seconds.

FIGURE 2



Note the position of the tank in relation to the needle valves. To prevent fouling, the air vents are as high as possible above the needle valves; high-wing models were convenient for this positioning. Maintaining rubber bands was important to reliable escapement operation.

Installing the system in a model required great care. The top of the tank had to be slightly lower than the engine's lowest needle valve so fuel wouldn't be siphoned into the venturi when either of the air-control vents was open. The tank had to be positioned as close as possible to the rear of the engine to maximize fuel draw (see Figure 2).

Sadly, when the tank was full, this arrangement required that the high-speed needle valve be set very rich, and this robbed the engine's power for the hand-launch takeoff; leaning the mixture usually produced a hot (lean) engine run or flameout as the tank emptied. The escapement air-control vents worked best when located well above the needle valves; otherwise, fuel and residual lubricating oil collected in their connecting tubes, blocking them off by capillary action.

The twin-needle-valve approach proved to be unsuitable for aerobatics because the crucial relationship between air-control vents and the tank couldn't be maintained. Straight and level flight was the order of the day! Inverted flight required a totally different system. The performance of the Torpedo .19 was reduced by several hundred rpm because of its small-bore carburetor, which was required to maintain a strong fuel-draw suction. The Torpedo seemed to run best between 11,500 and 14,500rpm, with a minimum reliable throttled speed of 4,500rpm; this generated a speed ratio of only 3.22:1 (14,500/4,500). Compare this with modern engines, which regularly obtain speed ratios of 6 or greater.

K&B's 2-speed Torpedo .19 engine.

Although marginal in its performance, the Torpedo twin-needle system impressed several other engine manufacturers including Cameron (.19), Cox (thermal Hopper .049) and Fox (.19), all of whom produced their own versions.

As a teenager, I can remember fellow club members (Flying Bisons) clapping and cheering when someone actually got their engine to throttle down with an escapement-driven, 2-needle unit! Figure 3 depicts an improved air-bleed system developed by Jim Walker in 1954. His pressure tank and regulator helped remedy deficiencies of the Bonner-Brodbeck unit and didn't require two venturi needle valves.

FOULED FOX

Floyd Maidment emails, "I have owned a Fox .19 for several years, and it has never been run. I tested the engine the other day and discovered that I could not turn it over. The throttle barrel had also seized. What is the best way to loosen up this engine?"

Your Fox .19 is probably gummed up; the factory ran all new engines on castor-based fuel before it sent them out. Over a period of years, residual castor oil within the engine thickens, producing the gumminess. To correct this, first attach a propeller securely to the shaft. Next, wearing an old oven mitt for protection, heat the engine a bit with a propane torch; be careful to keep the flame moving. When the castor begins to smoke, stop. Using the prop for leverage, apply a light to moderate twisting force (careful; you don't want to break the connecting rod) to the shaft; the castor-oil gum should have softened. If not, heat it a bit more. When the engine has broken free, it should then be disassembled and cleaned with an engine cleaner such as Demon-Clean.

NITRO: HOT OR COLD?

Mike B. emails, "I have two questions for you. Does a higher percentage of nitro in fuel make the engine run cooler or hotter? I have heard people argue this issue both ways. And, when will your next book come out?"

Mike, the answer to your second question is simple ... in a couple of years! All the research is done, and the writing is well under way.

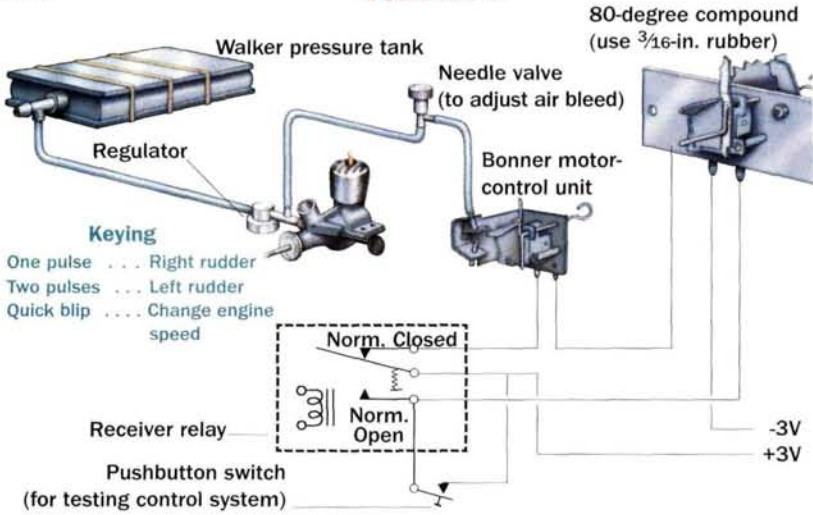
The first question is tougher! Nitro's heating ability—or lack thereof—reminds me of what control-line speed champion Luke Roy said 30 years ago concerning the same controversy: "The continued addition of nitro to a fuel blend will eventually cause the engine to freeze." Luke's tongue-in-cheek statement equates freezing with piston seizure—the unfortunate and often catastrophic result of nitro's heating effect on certain engine types.

The truth is, the higher the fuel's nitromethane percentage, the hotter the engine runs. The technical explanation for this phenomenon is a bit complicated, but many readers want to know about fuel, so let's give it a try.

As the percentage of nitromethane within a given fuel is increased, more power and heat are produced within the engine. This happens because increased chemical/thermal energy passes through the engine during a given period of time. Nitro has a very low heating value—pound for pound, about the same as burning firewood (5,000 British thermal units [BTU] per pound)! In contrast, gasoline has a heating value of almost 20,000 BTU per pound—better than nitro by a factor of 4. So why is nitro such a powerful ingredient?

The answer is in the fuel-to-air ratio (F/A). The "A" in the F/A ratio refers to the mass of air that the engine is capable of inducting because of its design and the prevailing atmospheric conditions. Since piston engines are air pumps, fuel must be added in the correct proportions if combustion is expected to occur efficiently.

FIGURE 3



Jim Walker's pressure tank and regulator worked well with an air-bleed, 2-speed throttle control.

Nitromethane has a peak power F/A ratio of about 1:1 (or higher), while gasoline's peak power F/A ratio is roughly .1:1—1/10 that of nitromethane. Because 10 times the weight of gasoline can be added to engine air in the form of nitromethane, its low heating value is more than offset. Example: if an automotive drag-race engine consumes 10 pounds of nitro per second, this is equal to 50,000 BTU/sec. (5,000 BTU x 10 lb./sec.), while 1 pound of gasoline per second is only 20,000 BTU/sec. (20,000 BTU x 1 lb./sec.). In terms of energy delivered per unit of inducted air, nitro is better than gasoline by a factor of 2½ during the same delivery time period. Of course, we don't use 100 percent nitro in our fuel, so the advantage over gasoline is reduced, but it is still substantial.

There's much more to the story of nitromethane, including its aggravating habit of detonating (combustion defect), which limits the engine's compression ratio, and a real thirst that requires very large tanks. Add its cost (about $35 per gallon), and you can see why some modelers switch to other fuels. ✦

SEND IN YOUR EVENT COVERAGE. Mail photos, captions and text (500 words or less) to "Grassroots," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Color slides and prints are acceptable.

Corvin Miller Memorial RC Scale Contest

For years, members of the Sarasota R/C Squadron have hosted the annual Royal Palm Scale Contest, a regional event that draws competitors from across the South to compete in a variety of scale categories. But following the passing of longtime fellow club member and friend, Corvin Miller, the Sarasota R/C Squadron decided that a fitting tribute was in order and unanimously agreed to re-dedicate the event. So, on a cool, crisp weekend last November, club members and entrants gathered instead for the first-ever Corvin Miller R/C Scale Classic in Sarasota, FL.

Despite a cool 15mph wind to open the two-day competition on Saturday, there was certainly no lack of eager pilots and spectators. Thirty-four models were entered in six categories: Fun-Scale Novice, Fun-Scale Advanced, Sportsman, Expert, Team and Designer. With 13 participants, the Fun-Scale Advanced division was by far the largest. With the exception

Bill Kimbrell of Sarasota, FL, built this L-19 Bird Dog from Vaillancourt plans. For power, he installed a Zenoah G-23 engine, and he uses an Airtronics radio for control. The aircraft weighs 18 pounds.

Curtis Switzer comes in for a landing with his Great Planes PT-19 ARF. He was seventh in Fun-Scale Advanced.

Above: Logan Arbuckle finished third in Fun-Scale Advanced with this Great Planes JU-87 Stuka ARF. The model has an O.S. .61 engine for power and an Airtronics radio for control.

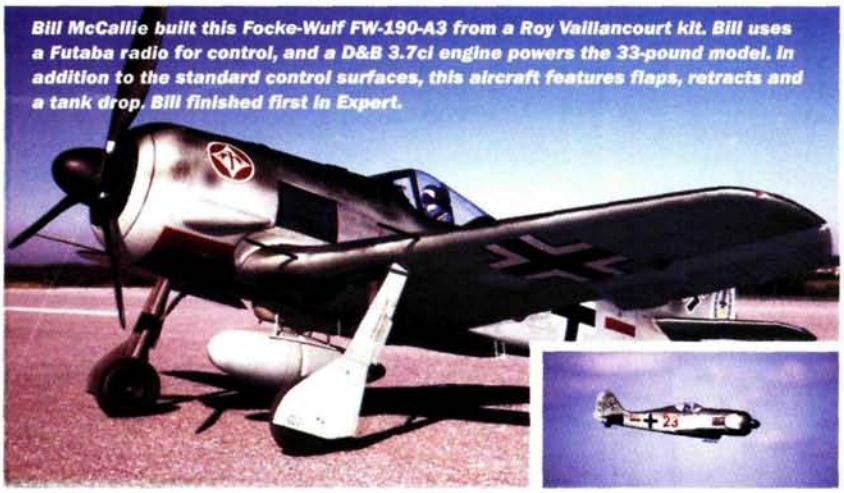
Left: the Civil Air Patrol was present each day for the playing of the national anthem.

Trip Galasso powers this 49-pound C-47-A with two Zenoah G-38 engines, and he controls it with a Futaba radio. During one maneuver, three paratroopers jumped from the aircraft. Rubber bands helped launch the jumpers.

Above: Andres Ellis of Parkland FL, entered this Super Stearman PT-13D in the Sportsman competition. Built from a modified Balsa USA kit, the 52-pound model has a 3W 1.50 engine for power and a JR radio for control. The cowl is made from aluminum and features more than 300 actual aircraft rivets.

Bottom: Logan Arbuckle (left) is at the controls of his JU-87 Stuka. His father, Thom (center), and twin brother, Thomas (right), assisted him during the flight.

Bruce Horvath entered this Super Decathlon in the Sportsman class, but unfortunately he experienced some difficulty and was able to complete only one round.



Bill McCallie built this Focke-Wulf FW-190-A3 from a Roy Vaillancourt kit. Bill uses a Futaba radio for control, and a D&B 3.7ci engine powers the 33-pound model. In addition to the standard control surfaces, this aircraft features flaps, retracts and a tank drop. Bill finished first in Expert.

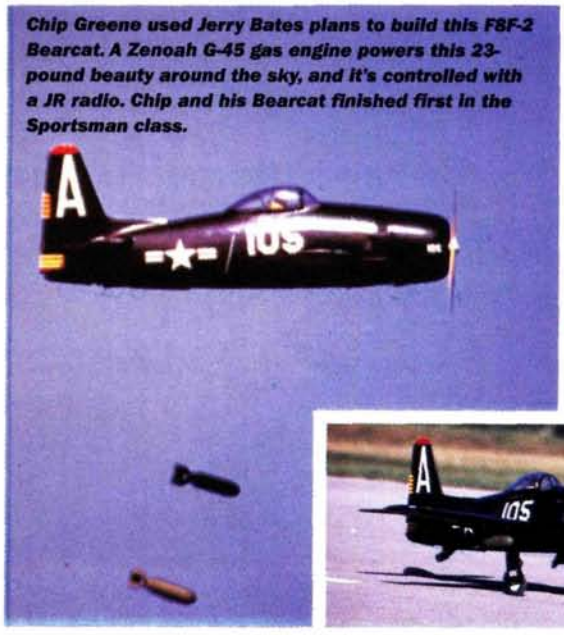
of the Fun-Scale Novice division (flight only), a combination of static and flight scores determined the winners. In the end, those who ranked in the top three in each category went home with a beautifully engraved plaque.

When the dust finally settled on that beautiful Sunday afternoon, Dave Platt stood atop the Designer class, and Chip Greene had wrapped up the Sportsman with his F8F-2 Bearcat. In Fun-Scale Advanced, the teenagers took control, finishing in the top three places. Twins Thomas and Logan Arbuckle finished first and third, respectively, with Chris Buell taking home second. All three dominated the Fun-Scale Advanced category the previous year, and they obviously have continued to improve. Look for them to challenge the big names in scale competition in the near future.

Overall, the first-ever Corvin Miller R/C Scale Classic was a rousing success. The relaxing, friendly atmosphere fostered by members of the Sarasota R/C Squadron provided everyone with an opportunity to enjoy the company of old friends and participate in a little healthy competition. It's a great event, enjoyed by competitors and spectators alike. I highly recommend making the trip.

—by Phil Bousquet

Above and left: Dave Platt of Palm Bay, FL, was first in Designer Scale with this scratch-built Aichi D3A-1 "Val." A Moki 2.10 engine powers the 27-pound model, and Dave uses a JR radio for control.



Chip Greene used Jerry Bates plans to build this F8F-2 Bearcat. A Zenoah G-45 gas engine powers this 23-pound beauty around the sky, and it's controlled with a JR radio. Chip and his Bearcat finished first in the Sportsman class.

Above: it took Jim Martin two years to produce this Citabria Pro from a Balsa USA kit. An O.S. 1.20 4-stroke engine powers the 11½-pound model, and Jim uses a Futaba radio for control.

CLASSIFIEDS

RATES: non-commercial—25 cents per word (no commercial ads of any kind accepted at this rate); commercial—50 cents per word (applies to retailers, manufacturers, etc.); count all initials, numbers, name and address, city, state, zip code and phone number. **All ads must be paid for in advance.** To run your ad for more than one month, multiply your payment by the number of months you want it to run. Deadline: the 10th day of the month, 3 months in advance, e.g., *January 10 for the April issue.* We don't furnish box numbers, and it isn't our policy to send tear sheets. Please make all checks payable to: **AIR AGE INC. SEND AD AND PAYMENT TO: CLASSIFIED ADS, *Model Airplane News*, 100 E. Ridge, Ridgefield, CT 06877-4606 USA, or call (203) 431-9000.**

BUSINESS

BJ'S MODEL ENGINE SERVICE*—36 Macintosh Dr., Oxford, CT 06478; phone (203) 888-4819; email wbilljensen@cs.com, website: www.starcomposites.com/BJModelEngines. *a trade name of Flight Star Devices Inc. [6/03]

BEARING REPLACEMENT SERVICE. Bring new life to your engine. Most size RC engines, $49.99 plus shipping. High-quality bearings with 20 years' experience. J&L Power Products Inc., (262) 628-3506 or info@jlproducts.net. [5/03]

LIMITED TIME OFFER: FREE adjustable engine mount. See mount at www.southfloridahobbies.com/mount.htm. [9/03]

AG-AIRCRAFT PLANS. Pawnee, Agwagon, Pawnee Brave, Transavia Airtruk/Skyfarmer, Fletcher FU-24, Cropmaster and more. Hardware paks, colour photo paks, free documentation. Catalog/price list: $5 (U.S.); Visa/MC. New Zealand Aero Products, 34 Ward Parade, Stirling Point, Bluff, New Zealand. Mobile: ++ 6425-213-3653. [3/04]

VIDEOS: model and full-scale aircraft. Information: www.MyFlyingVideos.com, or Raymond Keel, 1200 E. Davis St., Ste. 115, Box 192, Mesquite, TX 75149. [2/04]

FLYING RYOBI—HOMELITE—WEEDEATER? Get a lot more power and economy from stock ignitions! No cutting/drilling of engine. Gives outrageous top end and holds idle! Template and instruction for simple, light, "one-fits-all" ignition modification. Send $9.75, USD, payable to Christopher Couture. Mail to: Timing is Everything! c/o Tiffany Ptg. Co., 875 Tiogue Ave., Coventry, RI 02816. [5/03]

RYOBI CONVERSIONS. We are the oldest, the best and the least expensive. For complete engines, conversion kits, or our 360-degree muffler, we have all your conversion needs. For free conversion instructions and catalog, send SASE to Jag Engines, 16073 Muscatel, Hesperia, CA 92345; (760) 244-7270, or see our website at www.jagengines.com. [7/03]

ALUMINUM CAN CRAFT PLANS: Build airplanes, vehicles, locomotives and construction equipment. Free list. Tesscar, Box 333A,Scappoose, OR 97056, or www.tesscar-aluminum-craft.com. [12/03]

PLANS: Oldtimer, Nostalgia, RC Sailplanes, sport, scale. 140 plans. Catalog, $2. Cirrus Aviation, Box 1375, Nanton, Alberta, T0L 1R0 Canada; www.cirrusaviation.ca. [9/03]

BOB'S AIRCRAFT DOCUMENTATION 2003. World's largest commercial collection of aircraft photos (400,000) and 3-view line drawings (38,000). 272-page catalog, $10 (Canada, Mexico, Alaska, Hawaii & Puerto Rico, $12; foreign: $20; includes air postage). 3114 Yukon Ave., Costa Mesa, CA 92626; (714) 979-8058; www.bobsairdoc.com. [2/04]

www.telstarhobbies.com Crash videos! Your online source for RC and full-scale aviation books and videos. (772) 286-2535; sales@telstarhobbies.com. [5/03]

MODEL AIRPLANE SCHOOL: at Hobbies Aloft R/C Flight School, you will experience more than 100 hands-on landings per day of training until you solo—guaranteed! Ray Smith will be your personal trainer, and using "kinesthetic instruction" (no buddy-boxes), he will guide you down to each landing until you can execute the landing sequence all by yourself. Typical students require 4 to 6 days of training to solo, and then their RC flying fun really begins! We fly year-round on the beautiful California coast near Monterey. Call toll-free, (888) 700-4421 to make a reservation, and please visit our website: www.hobbiesaloft.com. [6/03]

HIGH-QUALITY ARFS AND FAST-BUILDING KITS: Sukhoi, Extra 300S, CAP 21, 60 to 90 sizes. Please visit www.vectorflight.com for complete details and secure online ordering. [10/03]

HOBBYIST

MAGAZINE BACK ISSUES: *Model Airplane News, RCM, FM.* Model and full-scale titles, 1930-1999. Send SASE for list: Carolyn Gierke, 1276 Ransom, Lancaster, NY 14086. [6/03]

USED ENGINES WANTED: pre-1970 preferred. T. Crouss, 100 Smyrna, West Springfield, MA 01089. [11/03]

MODEL MAGAZINES, 1930s ON. Send wants to davidbrown46@cox.net. [11/03]

NAME THAT PLANE

Can you identify this aircraft?

SEND YOUR ANSWER to *Model Airplane News*, **Name that Plane Contest** (state issue in which plane appeared), 100 East Ridge, Ridgefield, CT 06877-4606 USA.

The winner will be chosen, four weeks following publication, from correct answers received (delivered by U.S. mail) and will be awarded a free, one-year subscription to *Model Airplane News*. If already a subscriber, the winner will be given a free, one-year subscription extension.

Congratulations to Dave Dougherty of Vilonia, AR, winner of April's "Name that Plane" contest. Dave was one of many readers who correctly identified the mystery plane as the Chace XC-123A—a jet-powered version of the XC-123. Developed from the Chace CG-20, an all-metal cargo glider, the XC-123 was a propeller-driven assault transport aircraft that featured two 2,100hp Pratt & Whitney R-2800 piston engines. The XC-123A, shown here, shared the same basic airframe but was powered by four General Electric J-47 turbojet engines rated at 5,200 pounds of thrust each. ✈

▼

MODEL Airplane NEWS

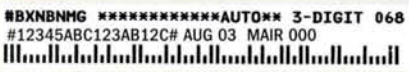
Customer Service

For fast service, go to:
www.modelairplanenews.com
and select "Customer Service"

All of the following services are available online!

- Change your address
- Report missing or damaged issues
- Make payments
- Check your account status
- Renew your subscription

How to read your label:



Your account number is 12345ABC123AB12C.
Your expiration date issue is August 2003.

Address changes

Please allow 4-6 weeks for address changes to be processed. To change your address by mail, send a copy of your current label and your new address information to:

Model Airplane News
P.O. Box 428
Mount Morris, IL 61054 USA

You can also contact us at MAIR@kable.com, or fax (815) 734-5827.
For faster service, go online.

Our cancellation policy

All cancellations must be requested in writing. You may send your request via mail, email, or fax.

Our renewal policy

We will send you a renewal notice 6 months prior to your subscription's expiration date. For faster service, renew online at **www.modelairplanenews.com**

Advertisers

3 Sea Bees Models 141
3D Kits 140
Ace Hobby Distributors Inc. C4
Aero Electric 151
Aerojet Composite Models 141
Aeroloft Designs 140
Aeroworks 123
Aerospace Composite Products 140
Aerotech Models 151
AirBorne Models 52, 53
AirFoil Aviation 139
Airtronics Inc. C3
America's Hobby Center 49
Arizona Models 159
Autogyro Co. of Arizona 152
Batteries America 149
Bob Smith Industries 43
C3GM 155
Cactus Aviation 145
Carl Goldberg Products Ltd. 37
Castle Creations 27
C. B. Tatone 136
Century Helicopter Products 99
Cermark 133, 138
Chase-Durer 75
Chief Aircraft 104, 105
Cleveland Model & Supply Co. 154
Dave Brown Products Inc. 136
Desert Aircraft 155
Du-Bro Products Inc. 71
Dumas Products Inc. 150
Dymond Modelsports USA Ltd. 95
Eddie A. Aircraft 149
ElectroDynamics 160
Falcon Air 155
Fan-Tastic Models 155
Fiberglass Specialties 154
Flight Line Toys 150
FMA Direct 101
Frank Tiano Enterprises 17
Fusco 159
Futaba 89, 103
G&P Sales 160
GiantScalePlanes.com 78, 79
Global Hobby Distributors 3, 14, 28, 29
Grand Wing Servos 12, 13
Great Planes Model Mfg. 4,5
Hacker Brushless USA 51
Hayes Products 152
Hitec RCD Inc. 82
Hobbico 57, 65, 83, 109
Hobby Lobby Intl. Inc. 77
Hobby People 90, 91
Horizon Hobby Inc. 7, 9, 21, 23, 25, 35, 107
Identity Check Printers 119
Ikarus USA 111
Internet-RC 26
J&B Access Panels 150
JK Aerotech LLC 154
JMD Models 160
K&S Engineering 155
Kamdax Development Ltd. 150
Kyosho 19
Landing Products 152
Lanier RC 124
Lite Machines Corp. 110
MaxCim Motors Inc. 141
Maxx Products Intl. 135
Mecoa 94
Megatech Intl. 49, 77
Micro Fasteners 151, 154
Miller R/C Products 152
Model Aircraft Performance 153
Model Machining Service 153
MRC/Model Rectifier Corp. C2
Modelbau USA 153
Morgan Fuel 59
Mountain Models 160
Nick Ziroli Plans 152
Northeast Sailplane Products 102
Northwest Hobby Technologies 144
Omni Products 137
Paul K. Guillow Inc. 144
Peak Electronics 151
Peck-Polymers 152
Performance R/C Products 147
Planrite Trading Co. Ltd. 63
PowerMaster Hobby Products Inc. 154
Propwash Video 144
Quantum Models 116, 117, 118
RC Showcase 148
Richmond RC Supply Ltd. 96, 97
Robart Mfg. 147
RTL Fasteners 144
Sig Mfg. Co. Ltd. 100, 114, 136, 146
SKS Video Productions 147
Sky Hooks & Rigging 147
Skyshark R/C Corp. 125
Slimline Mfg. 10
SoarSoft Software 154
Stalker Radar 160
Sullivan Products 11
Swanson Associates 160
Tekoa: The Center of Design 149
Thunder Tiger C4
Tower Hobbies 126, 127, 128, 129, 130
Toytronix LLC 149
Trick R/C LLC 113
Tru-Turn Precision Model Products 140
Universal Laser Systems Inc. 160
Wildcat RC Fuels 106
Windsor Propeller Co. Inc. 141, 153
Wireless Video Cameras 155
Yellow Aircraft Intl. 121
Zurich Intl. 139

MODEL AIRPLANE NEWS (USPS 533-470; ISSN 0026-7295) is published monthly by Air Age Inc., 100 East Ridge, Ridgefield, CT 06877-4606 USA.

Periodicals postage permit paid at Ridgefield, CT, and additional offices.

SUBSCRIPTIONS AND BACK ISSUES: U.S.: call (800) 827-0323; Canada and elsewhere: call (815) 734-1243; fax (815) 734-5827, or go to www.modelairplanenews.com. U.S., $29.95 (1 yr.); Canada $44.95, including GST (1 yr.); elsewhere: $54.95 (1 yr.). All foreign orders must be prepaid in U.S. funds; Visa, MC, Discover and AmEx accepted.

EDITORIAL: send correspondence to Editors, *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Email: man@airage.com. We welcome all editorial submissions, but assume no responsibility for loss/damage of unsolicited material. To authors, photographers and people featured in this magazine: all materials published in *Model Airplane News* become the exclusive property of Air Age Inc., unless prior arrangement is made in writing with the publisher.

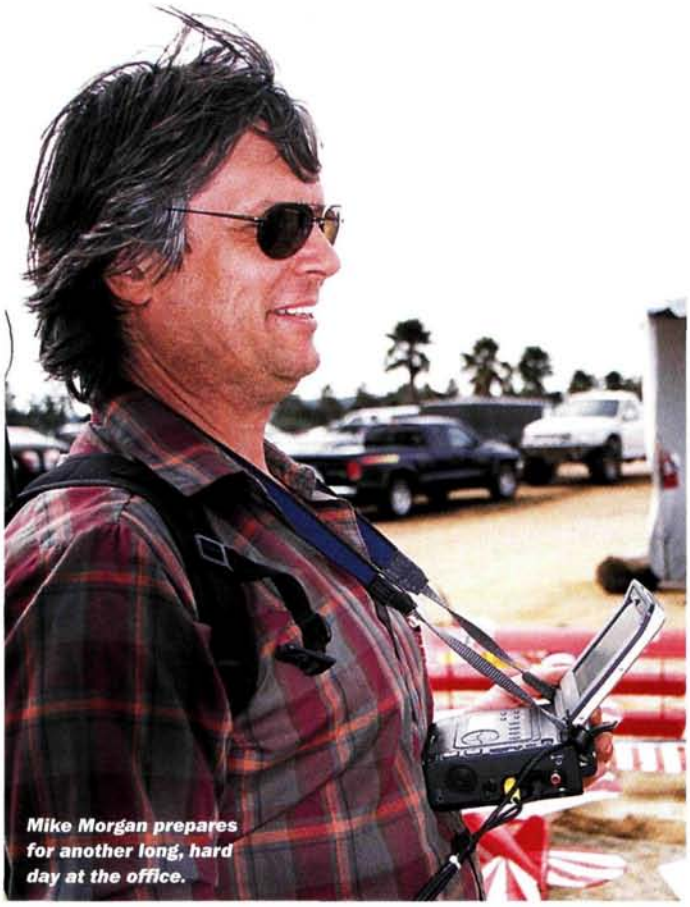
ADVERTISING: send advertising materials to Advertising Dept., Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606 USA; (203) 431-9000; fax (203) 431-3000.

CHANGE OF ADDRESS: to make sure you don't miss any issues, send your new address to *Model Airplane News*, P.O. Box 428, Mt. Morris, IL 61054 USA, six weeks before you move. Please include address label from a recent issue, or print the information exactly as shown on the label. For faster service, go to www.modelairplanenews.com and click on the customer service link.

POSTMASTER: send Form 3579 to *Model Airplane News*, P.O. Box 428, Mt. Morris, IL 61054 USA.

BY JOHN REID

Radio-control flight— *from hobby to career*



Mike Morgan prepares for another long, hard day at the office.

Many of us would like to earn a living flying RC planes, and Mike Morgan of San Diego, CA, has found a way to do just that! Mike has been able to incorporate his passion for flying remote-control planes into his work as a land surveyor. He uses a ¼-scale The World Models Piper Cub to take aerial photos—all by remote control. The highly modified Cub weighs 15 pounds without the camera equipment and 22 pounds all decked out and ready for work. Powered by a Kohler Actro 40-5 brushless motor with a 30-cell, 2600mAh NiMH battery, the Cub can stay aloft for 10 minutes—long enough to photograph one square mile of land.

The Cub's payload includes a Pentax 645 medium-format camera for high-quality prints with a 35mm wide-angle lens mounted on the bottom. This means that the Cub can photograph a large area of land at an altitude of 400 to 1,000 feet. Mike also mounted two video cameras in the plane that send real-time telemetry to a Sony digital recorder with a 5-inch LCD screen. One of the video cameras is pointed out the front window, and this enables Mike to fly the plane by just looking at the screen. The other video camera is attached to the Pentax's viewfinder and shows what the camera sees. Switching back and forth between the video cameras requires only a flip of a switch on the transmitter. Stuffed in between all of the camera equipment is a Garmin GPS receiver that gives an overlay readout on the video screen, showing the current latitude, longitude, airspeed and altitude (in meters)—extremely important information needed for land surveying. A stout roll bar in the cowl protects all of this equipment from rough landings—a nice feature because many of the fields haven't yet been graded when aerial photos are needed.

This aerial view was shot by the camera equipment aboard Mike's Cub.

A Pentax 35mm wide-angle lens mounted on the bottom of the Cub provides aerial footage of the land that needs to be surveyed.

A typical assignment goes like this: Mike straps on his backpack containing the equipment that receives all of the video telemetry from the plane. After he checks to make sure that everything works properly, the plane takes off. When the plane reaches an altitude of about 1,000 feet, Mike hands the video screen to the client, who can see the view through the Pentax camera. The client then tells Mike in which direction to fly so that the property to be surveyed can be lined up in the viewfinder. When the plane is directly over the area, Mike flips the switch to the forward video view and then back to the viewfinder video camera. This does two things: the Pentax camera snaps a photo, and the telemetry from the GPS receiver is recorded on the video continuously. When the video view is changed from the front to the viewfinder camera, the GPS information on the screen shows the plane's precise location at the time of the photo. The latitude, longitude, airspeed and altitude (in meters) are later transferred for the client onto the finished aerial photo to give him all the pertinent information.

Mike turned his love of flying radio-control aircraft into a successful career; I wonder which other professions would benefit from the advantages of RC flight!

This 22-pound (fully loaded), ¼-scale Cub makes quick work of a land surveyor's job.

PHOTOS BY MIKE MORGAN